US011496544B2

(12) **United States Patent**
Pavlovskaia et al.

(10) **Patent No.: US 11,496,544 B2**
(45) **Date of Patent: Nov. 8, 2022**

(54) **STORY AND SUB-STORY NAVIGATION**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **17/135,422**

(22) Filed: **Dec. 28, 2020**

(65) **Prior Publication Data**

US 2021/0227016 A1 Jul. 22, 2021

Related U.S. Application Data

(63) Continuation of application No. 16/155,782, filed on Oct. 9, 2018, now Pat. No. 10,911,575, which is a continuation of application No. 14/704,212, filed on May 5, 2015, now Pat. No. 10,135,949.

(51) **Int. Cl.**

H04L 67/06	(2022.01)
H04L 67/306	(2022.01)
H04L 67/01	(2022.01)
H04L 67/52	(2022.01)
H04L 67/55	(2022.01)

(52) **U.S. Cl.**

CPC ***H04L 67/06*** (2013.01); ***H04L 67/01*** (2022.05); ***H04L 67/306*** (2013.01); *H04L 67/52* (2022.05); *H04L 67/55* (2022.05)

(58) **Field of Classification Search**

CPC ... H04L 67/306; H04L 2209/60; H04L 67/22; H04L 67/06; H04L 67/01; H04L 67/52; H04L 67/55; H04N 21/44222; H04N 21/47205

See application file for complete search history.

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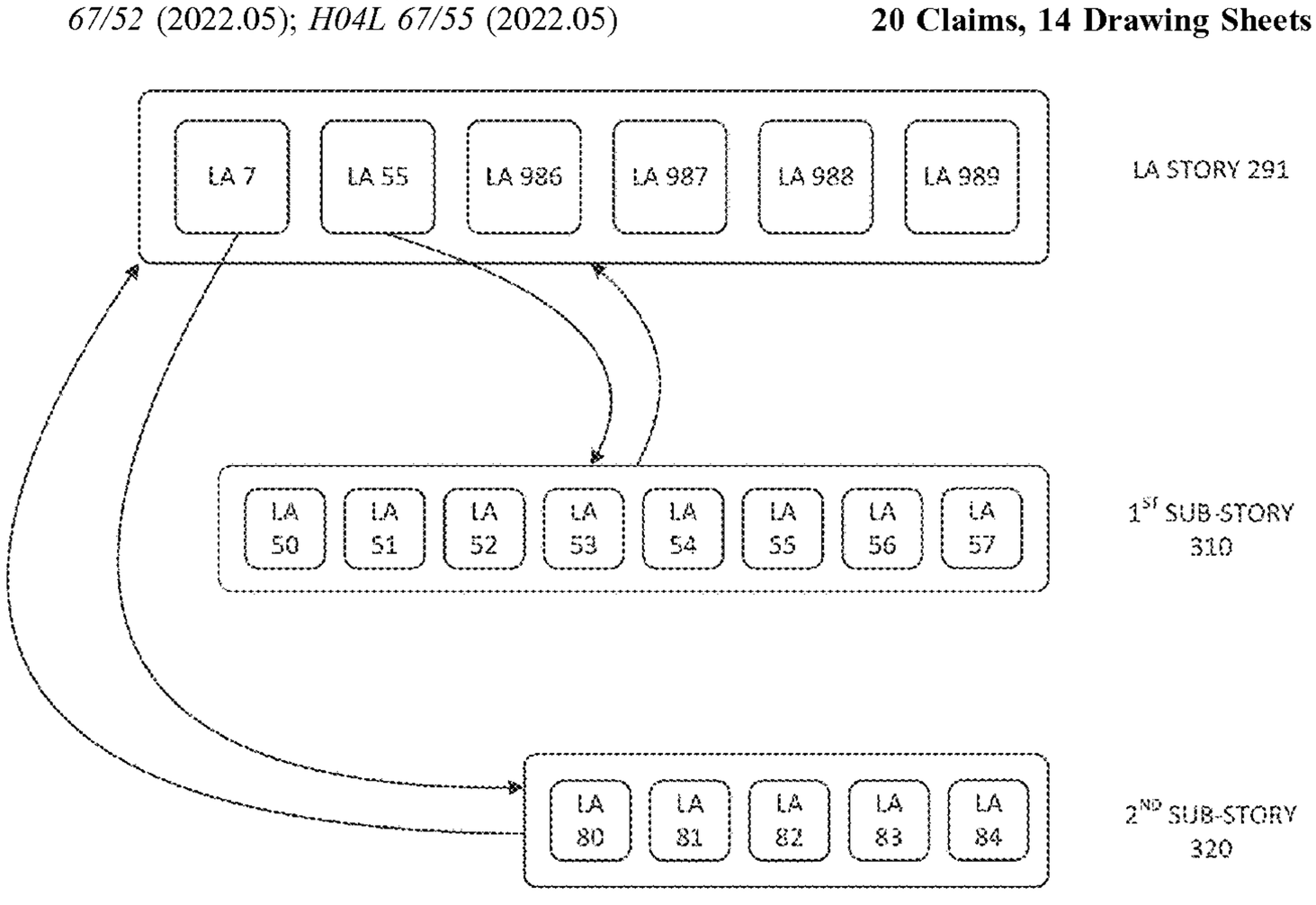
(57) **ABSTRACT**

Systems and methods for generating and managing stories and sub-stories presented to a user's client device are described. In one example embodiment, a server system communicates a portion of a first story to a first client device based on a first client device association with a user segment assigned to the first story. The server system receives a first selection communication associated with a first piece of content of the first story, accesses a second story based on the selection, and communicates a portion of the second story to the first client device.

20 Claims, 14 Drawing Sheets



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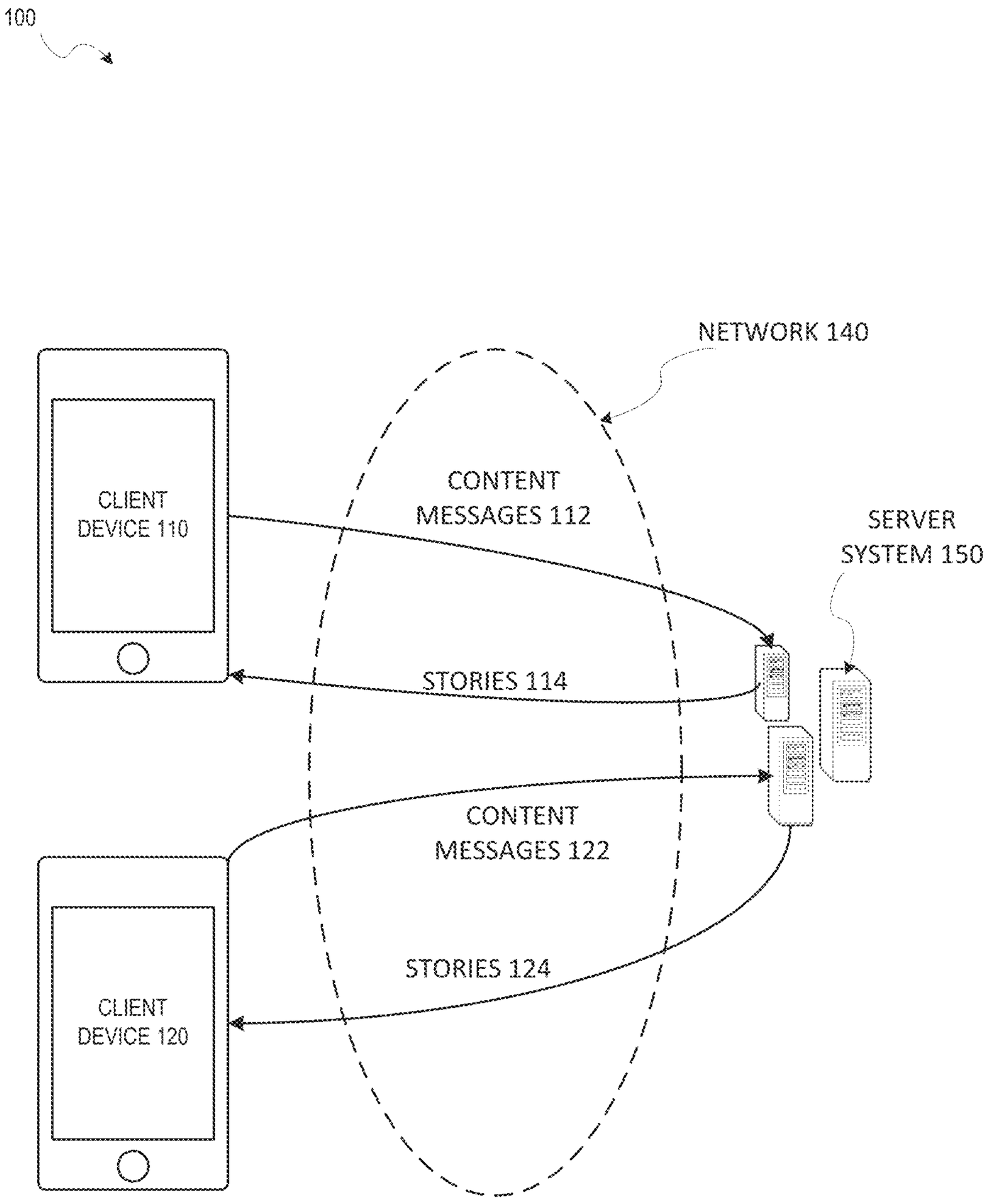
100
NETWORK 140
CLIENT DEVICE 110
CONTENT MESSAGES 112
SERVER SYSTEM 150
STORIES 114
CONTENT MESSAGES 122
STORIES 124
CLIENT DEVICE 120

FIG. 1

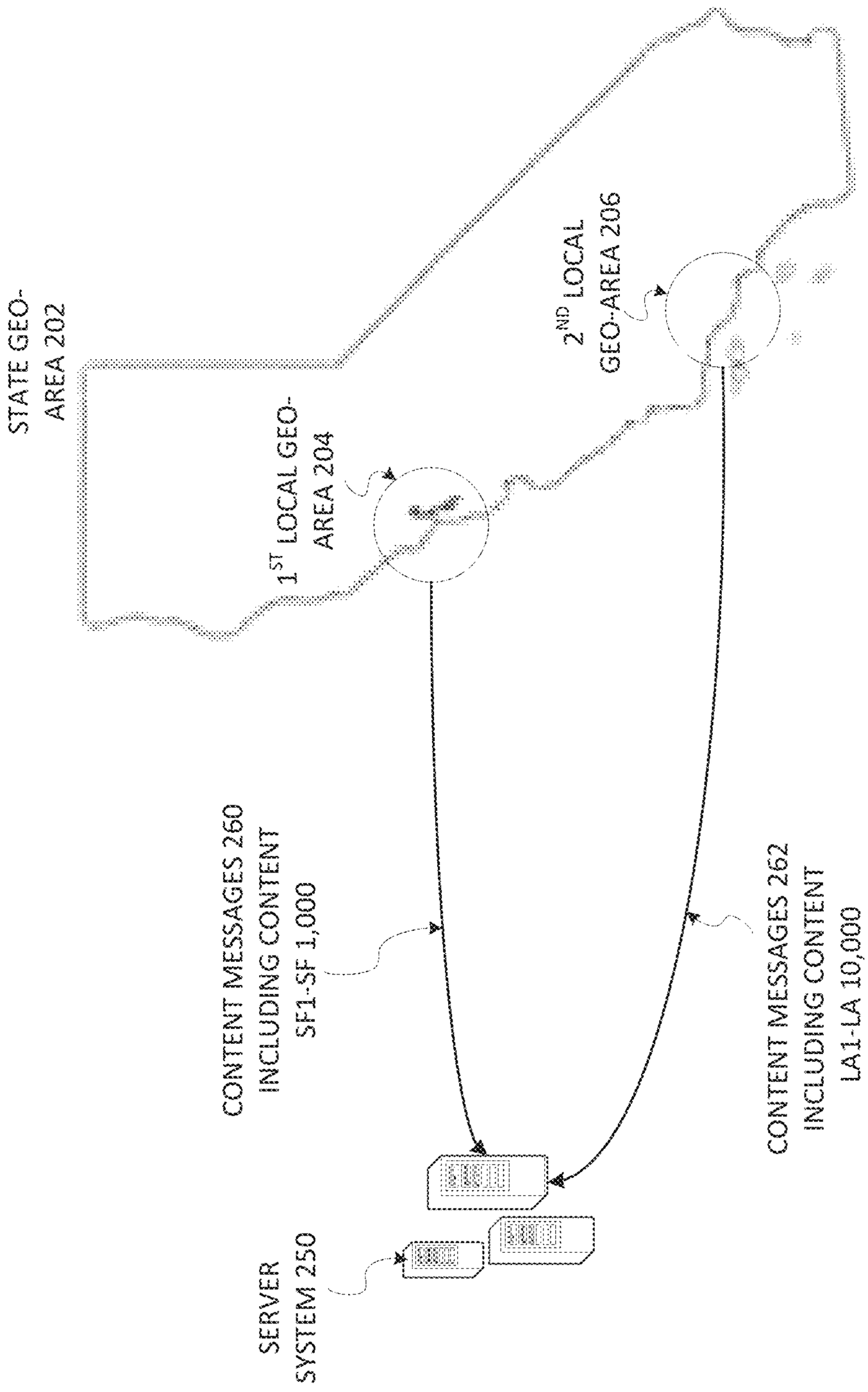
STATE GEO-AREA 202
1ST LOCAL GEO-AREA 204
2ND LOCAL GEO-AREA 206
CONTENT MESSAGES 260 INCLUDING CONTENT SF1-SF 1,000
CONTENT MESSAGES 262 INCLUDING CONTENT LA1-LA 10,000
SERVER SYSTEM 250

FIG. 2A

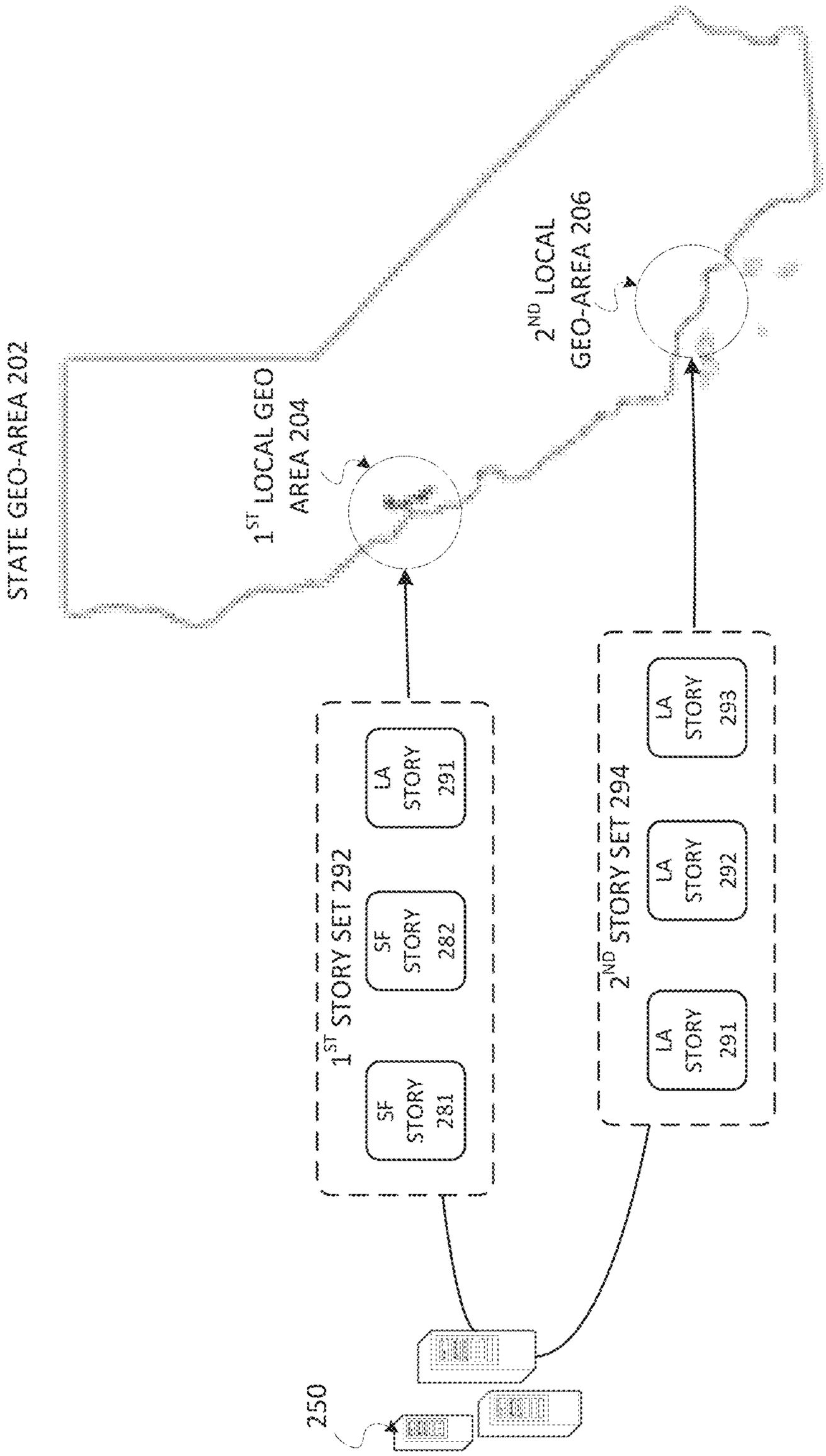
STATE GEO-AREA 202
1ST LOCAL GEO-AREA 204
2ND LOCAL GEO-AREA 206
1ST STORY SET 292
SF STORY 282
LA STORY 291
2ND STORY SET 294
LA STORY 292
LA STORY 293
1ST STORY SET 292
SF STORY 281
2ND STORY SET 294
LA STORY 291
250

FIG. 2B

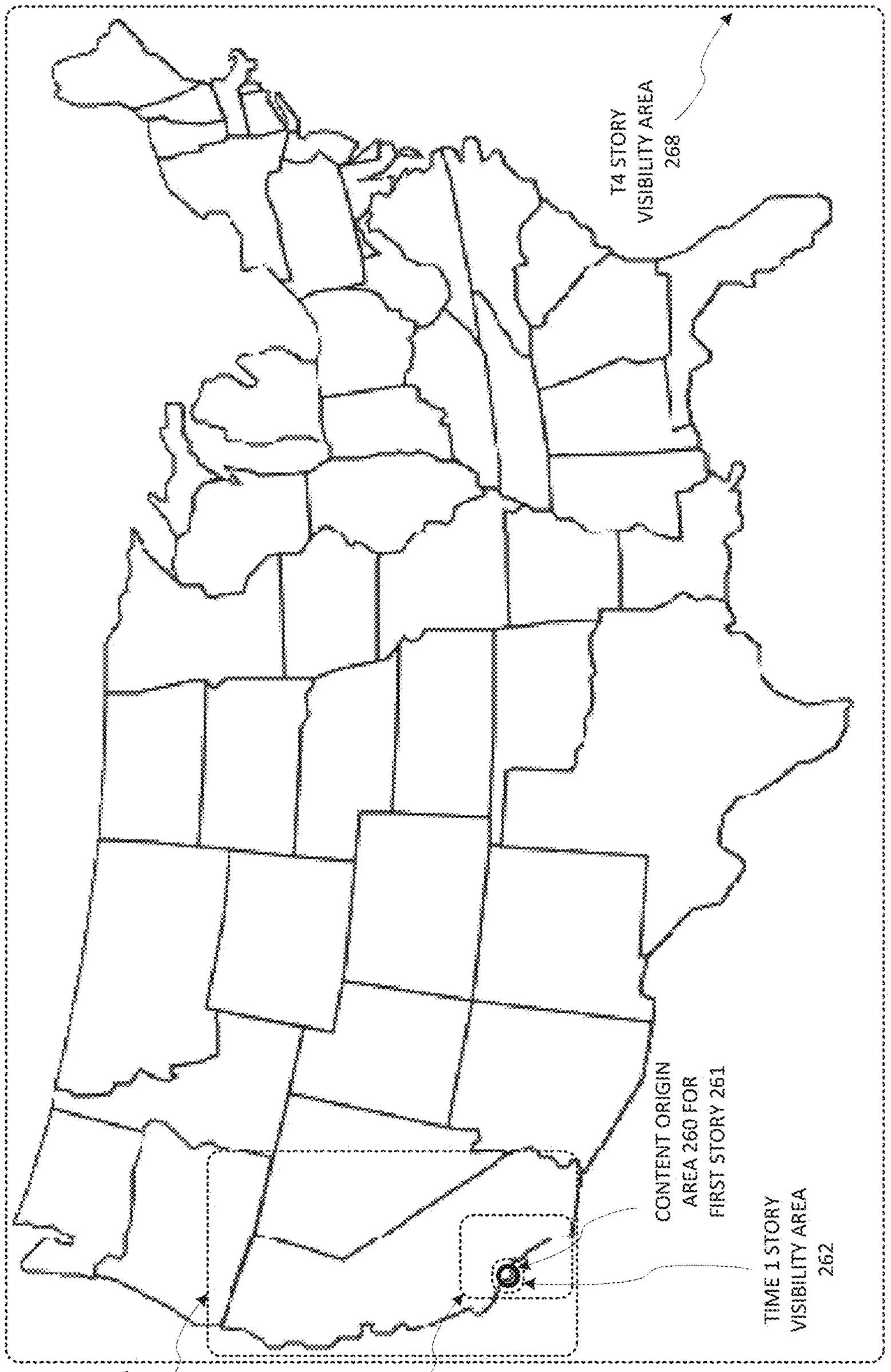
T4 STORY
VISIBILITY AREA
268
CONTENT ORIGIN
AREA 260 FOR
FIRST STORY 261
TIME 1 STORY
VISIBILITY AREA
262
T2 STORY
VISIBILITY
AREA 264
T3 STORY
VISIBILITY AREA
266

FIG. 2C

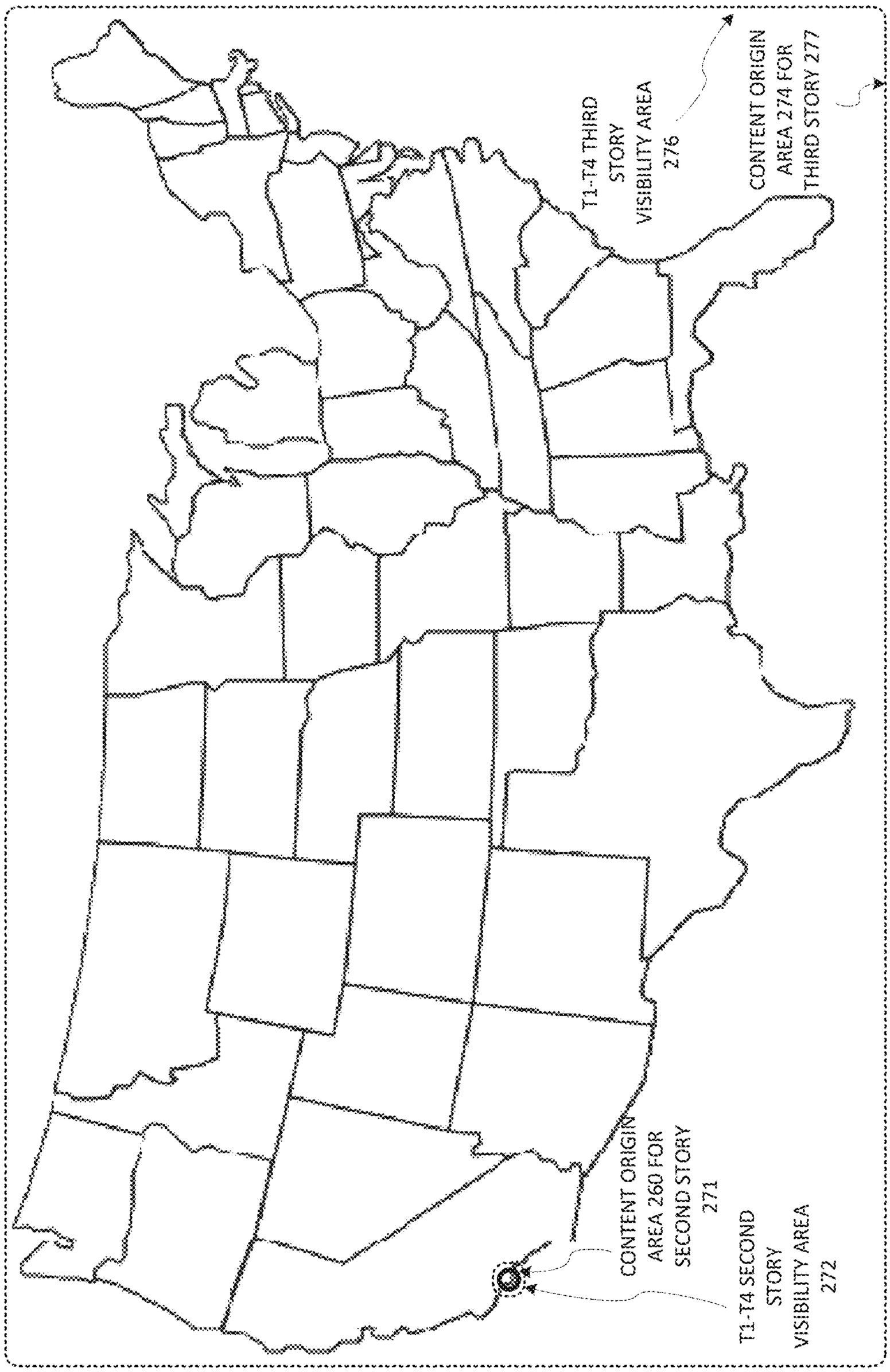
T1-T4 THIRD STORY VISIBILITY AREA 276
CONTENT ORIGIN AREA 274 FOR THIRD STORY 277
CONTENT ORIGIN AREA 260 FOR SECOND STORY 271
T1-T4 SECOND STORY VISIBILITY AREA 272

FIG. 2D

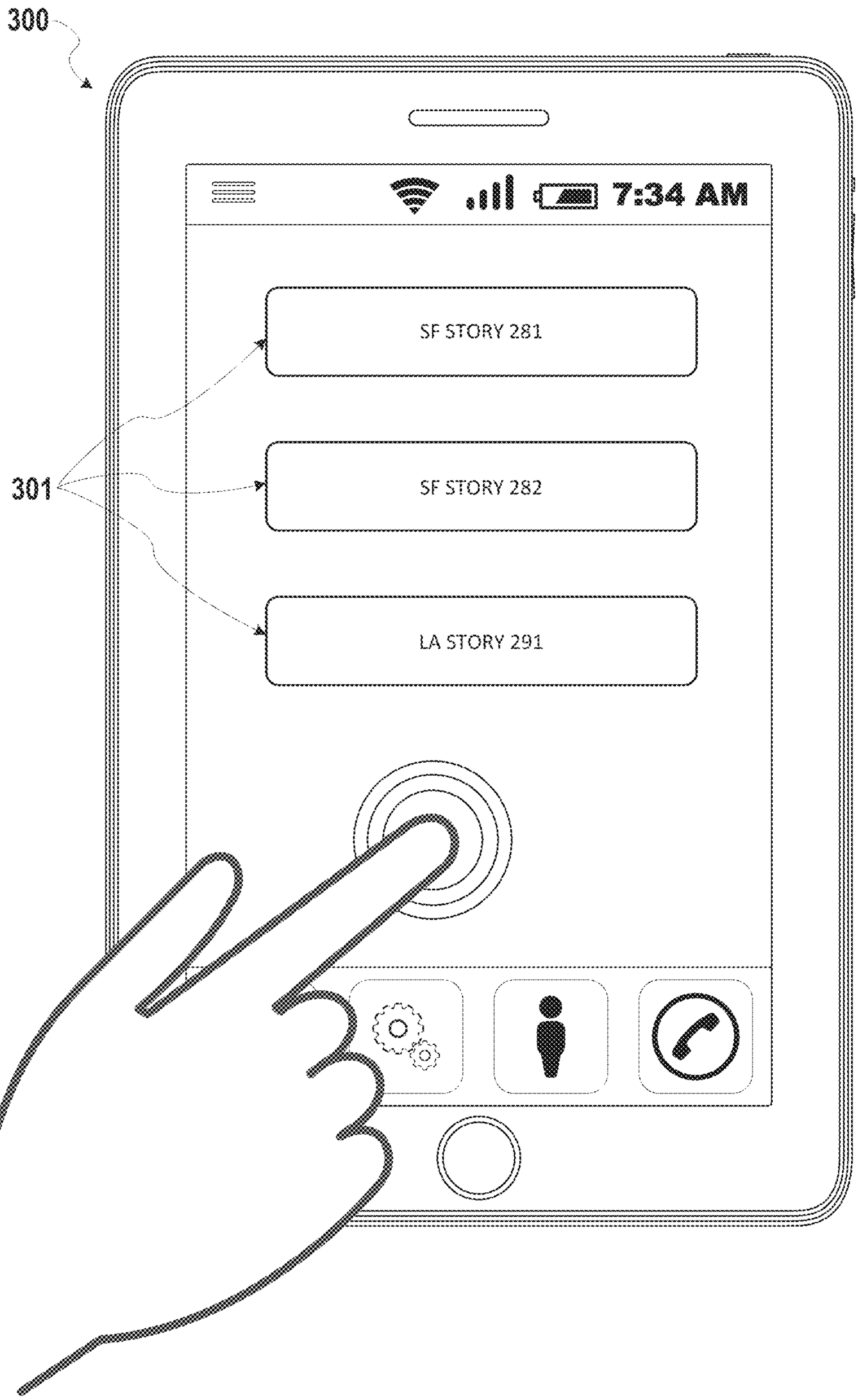

FIG. 3A

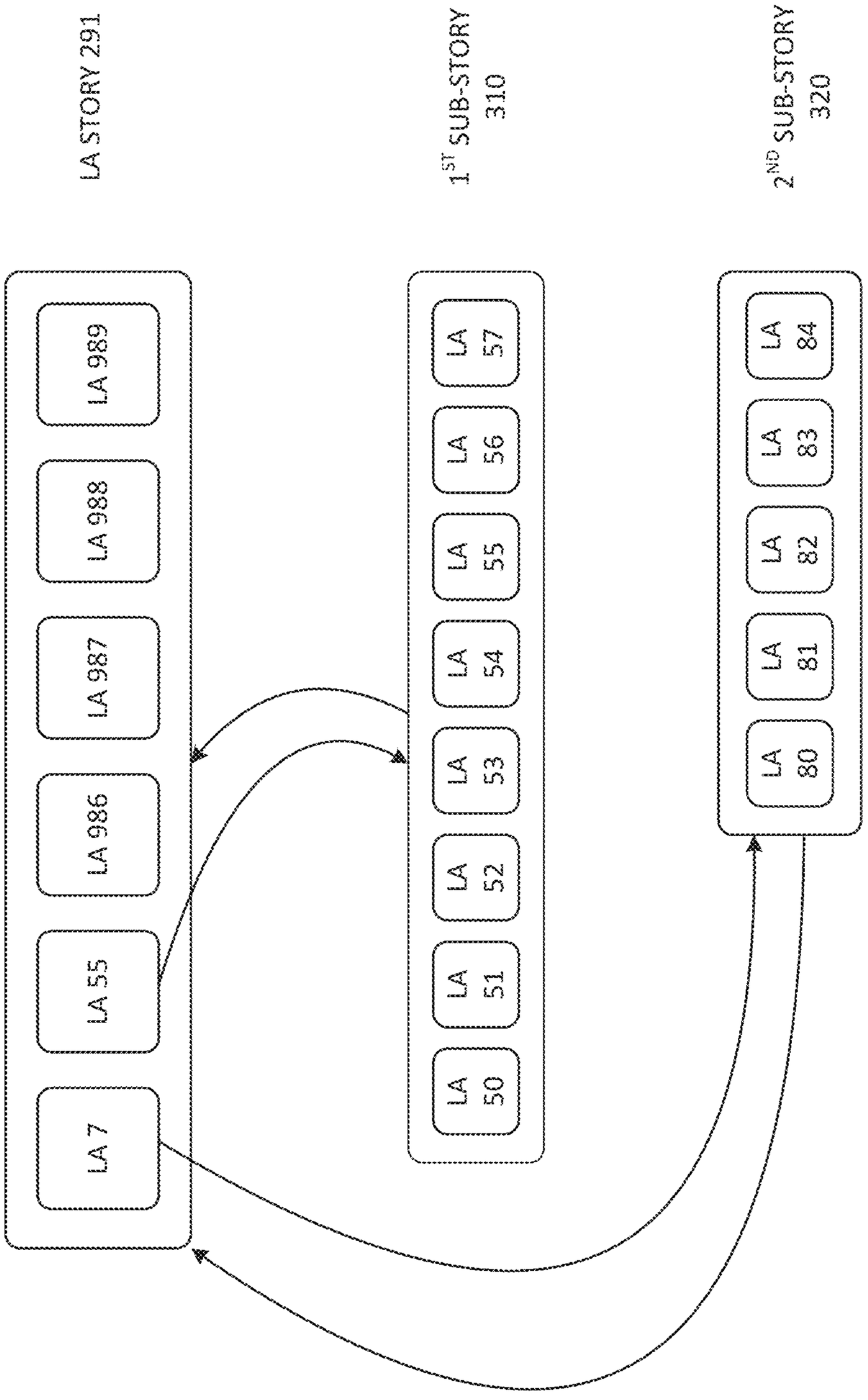
LA STORY 291
1ST SUB-STORY 310
2ND SUB-STORY 320
LA 55
LA 986
LA 987
LA 988
LA 989
LA 7
LA 50
LA 51
LA 52
LA 53
LA 54
LA 55
LA 56
LA 57
LA 80
LA 81
LA 82
LA 83
LA 84

FIG. 3B

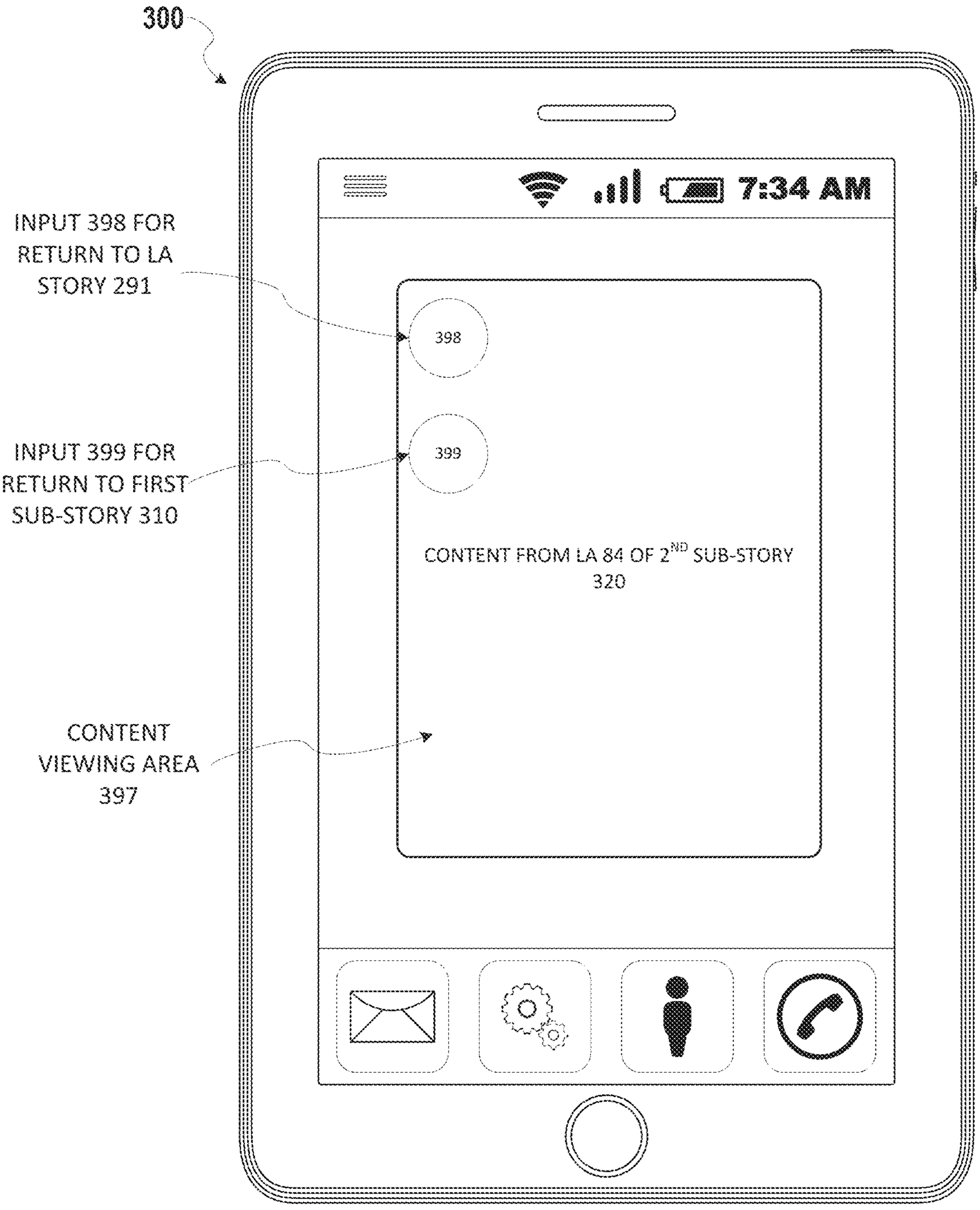
300
INPUT 398 FOR RETURN TO LA STORY 291
INPUT 399 FOR RETURN TO FIRST SUB-STORY 310
CONTENT VIEWING AREA 397
7:34 AM
398
399
CONTENT FROM LA 84 OF 2ND SUB-STORY 320

FIG. 3C

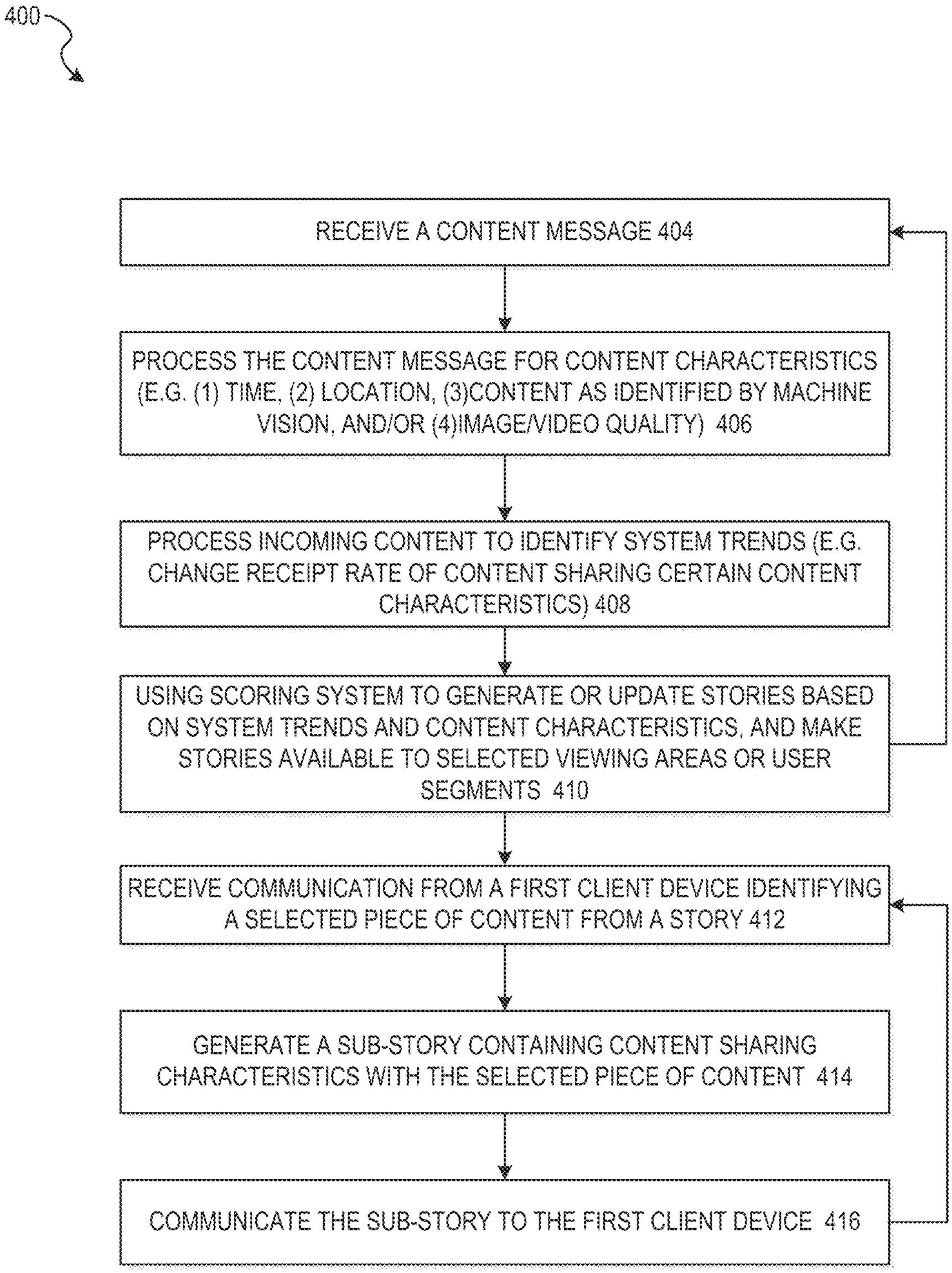
400
RECEIVE A CONTENT MESSAGE 404
PROCESS THE CONTENT MESSAGE FOR CONTENT CHARACTERISTICS (E.G. (1) TIME, (2) LOCATION, (3)CONTENT AS IDENTIFIED BY MACHINE VISION, AND/OR (4)IMAGE/VIDEO QUALITY) 406
PROCESS INCOMING CONTENT TO IDENTIFY SYSTEM TRENDS (E.G. CHANGE RECEIPT RATE OF CONTENT SHARING CERTAIN CONTENT CHARACTERISTICS) 408
USING SCORING SYSTEM TO GENERATE OR UPDATE STORIES BASED ON SYSTEM TRENDS AND CONTENT CHARACTERISTICS, AND MAKE STORIES AVAILABLE TO SELECTED VIEWING AREAS OR USER SEGMENTS 410
RECEIVE COMMUNICATION FROM A FIRST CLIENT DEVICE IDENTIFYING A SELECTED PIECE OF CONTENT FROM A STORY 412
GENERATE A SUB-STORY CONTAINING CONTENT SHARING CHARACTERISTICS WITH THE SELECTED PIECE OF CONTENT 414
COMMUNICATE THE SUB-STORY TO THE FIRST CLIENT DEVICE 416

FIG. 4

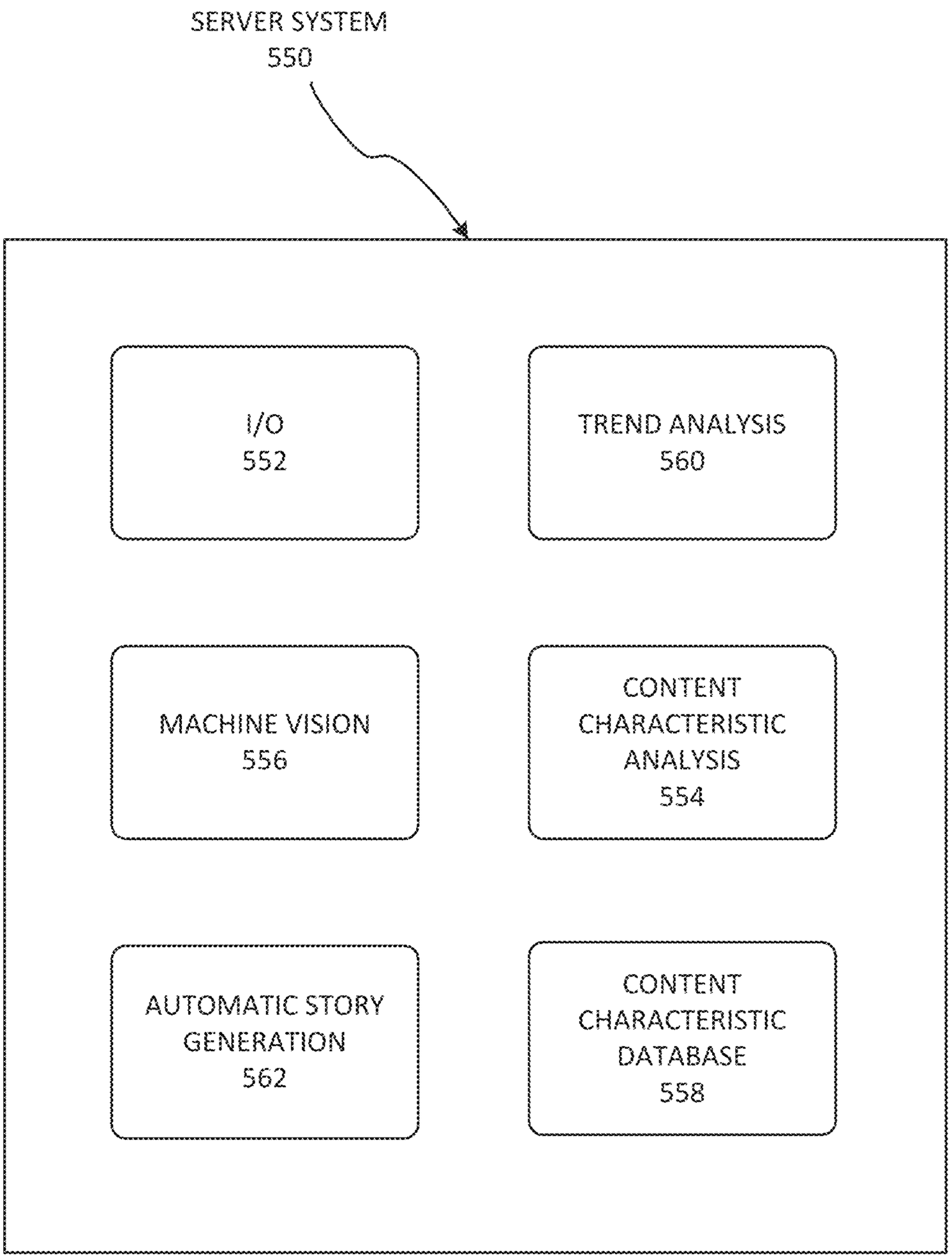
SERVER SYSTEM
550
I/O
552
TREND ANALYSIS
560
MACHINE VISION
556
CONTENT
CHARACTERISTIC
ANALYSIS
554
AUTOMATIC STORY
GENERATION
562
CONTENT
CHARACTERISTIC
DATABASE
558

FIG. 5

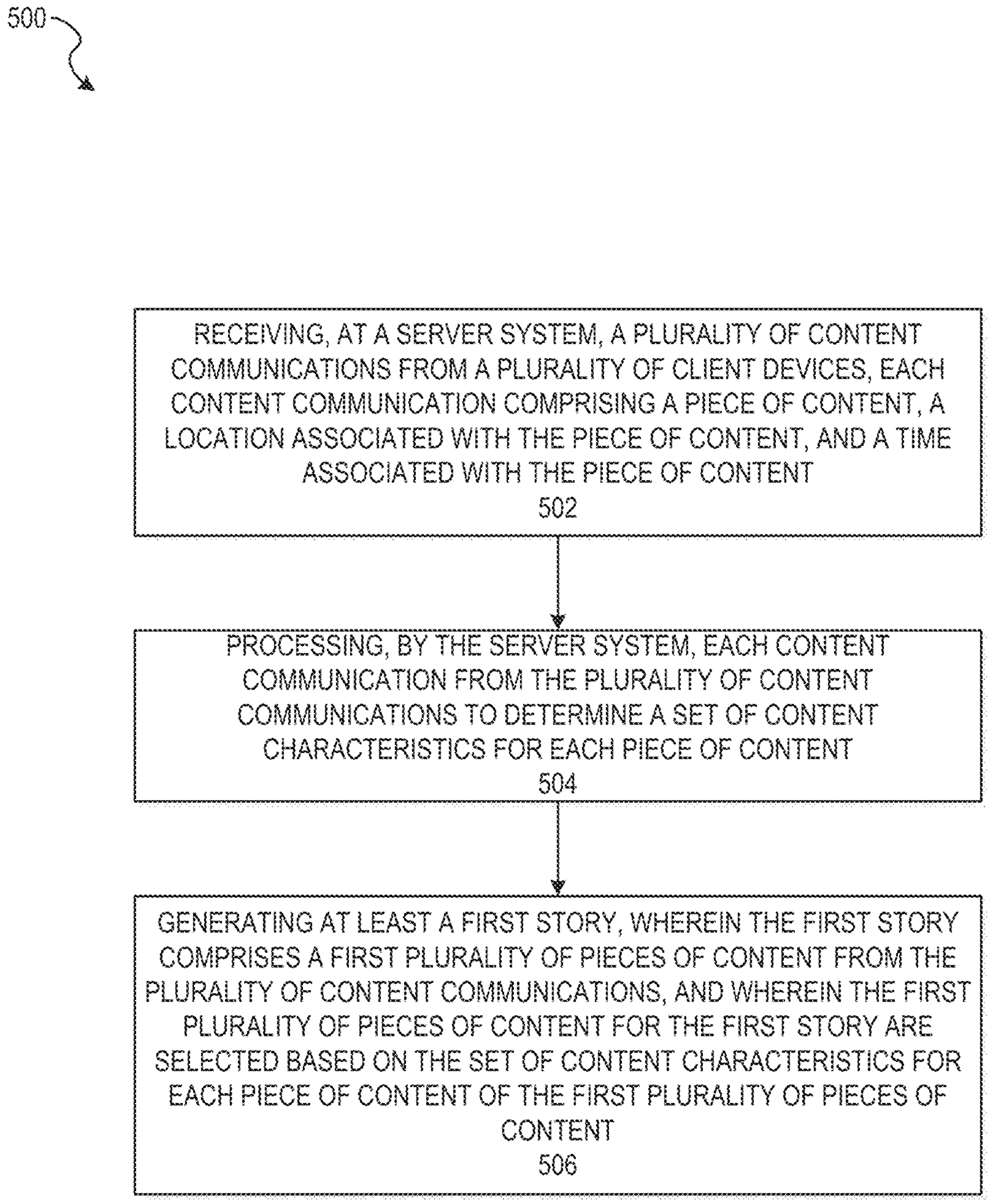
500
RECEIVING, AT A SERVER SYSTEM, A PLURALITY OF CONTENT COMMUNICATIONS FROM A PLURALITY OF CLIENT DEVICES, EACH CONTENT COMMUNICATION COMPRISING A PIECE OF CONTENT, A LOCATION ASSOCIATED WITH THE PIECE OF CONTENT, AND A TIME ASSOCIATED WITH THE PIECE OF CONTENT
502
PROCESSING, BY THE SERVER SYSTEM, EACH CONTENT COMMUNICATION FROM THE PLURALITY OF CONTENT COMMUNICATIONS TO DETERMINE A SET OF CONTENT CHARACTERISTICS FOR EACH PIECE OF CONTENT
504
GENERATING AT LEAST A FIRST STORY, WHEREIN THE FIRST STORY COMPRISES A FIRST PLURALITY OF PIECES OF CONTENT FROM THE PLURALITY OF CONTENT COMMUNICATIONS, AND WHEREIN THE FIRST PLURALITY OF PIECES OF CONTENT FOR THE FIRST STORY ARE SELECTED BASED ON THE SET OF CONTENT CHARACTERISTICS FOR EACH PIECE OF CONTENT OF THE FIRST PLURALITY OF PIECES OF CONTENT
506

FIG. 6

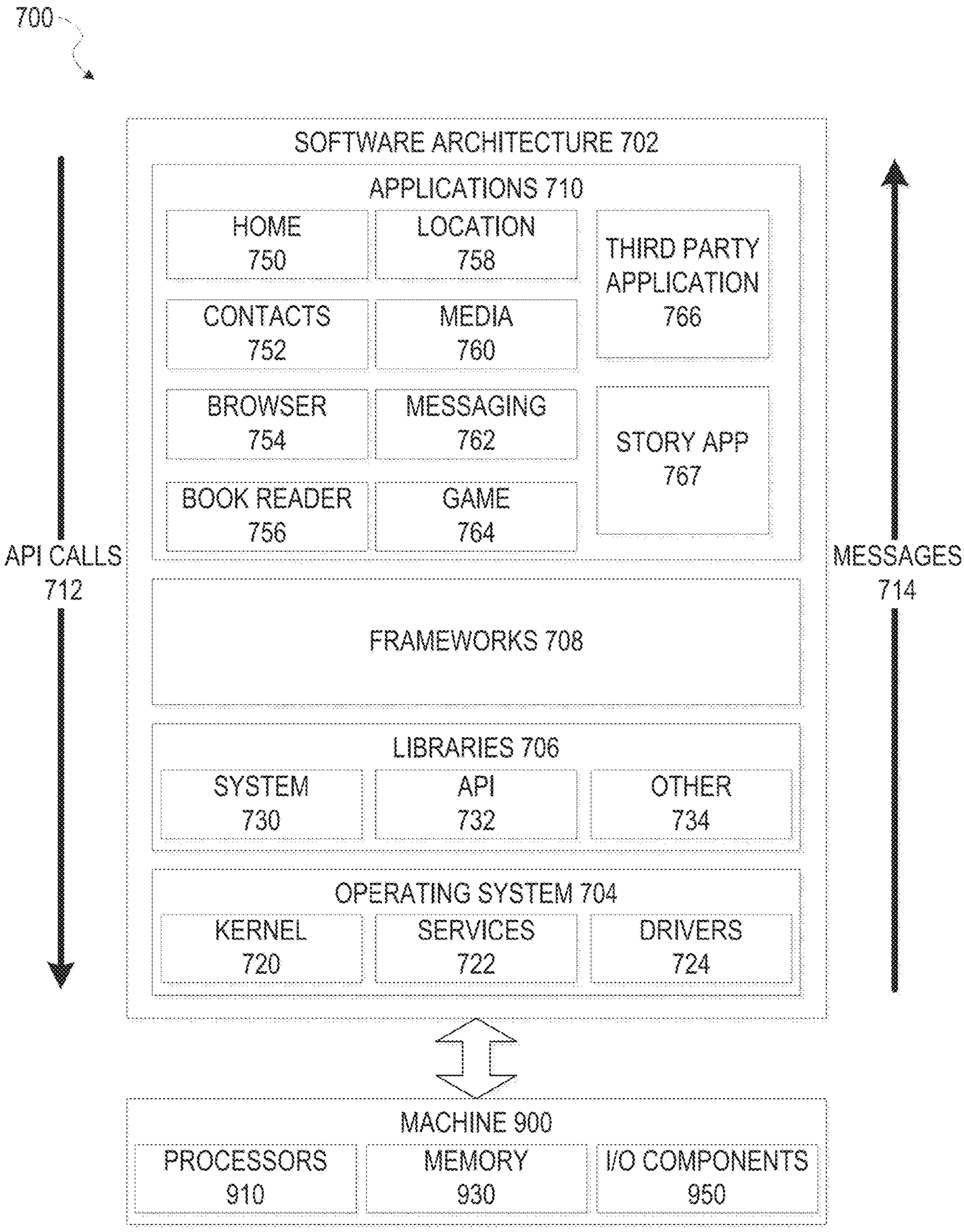
700
SOFTWARE ARCHITECTURE 702
APPLICATIONS 710
HOME 750
LOCATION 758
CONTACTS 752
MEDIA 760
BROWSER 754
MESSAGING 762
BOOK READER 756
GAME 764
THIRD PARTY APPLICATION 766
STORY APP 767
FRAMEWORKS 708
LIBRARIES 706
SYSTEM 730
API 732
OTHER 734
OPERATING SYSTEM 704
KERNEL 720
SERVICES 722
DRIVERS 724
API CALLS 712
MESSAGES 714
MACHINE 900
PROCESSORS 910
MEMORY 930
I/O COMPONENTS 950

FIG. 7

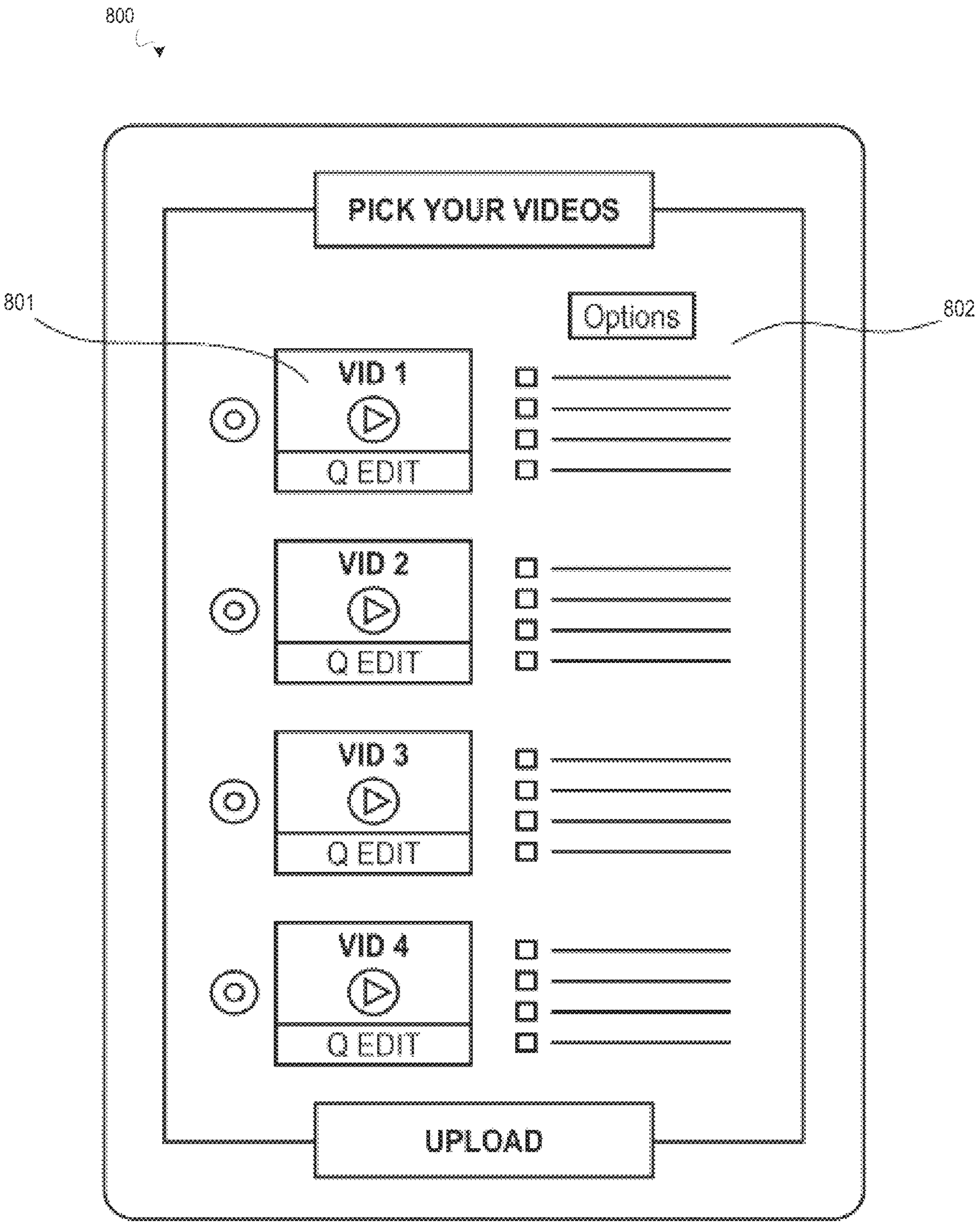
800
PICK YOUR VIDEOS
801
802
Options
VID 1
Q EDIT
VID 2
Q EDIT
VID 3
Q EDIT
VID 4
Q EDIT
UPLOAD

FIG. 8

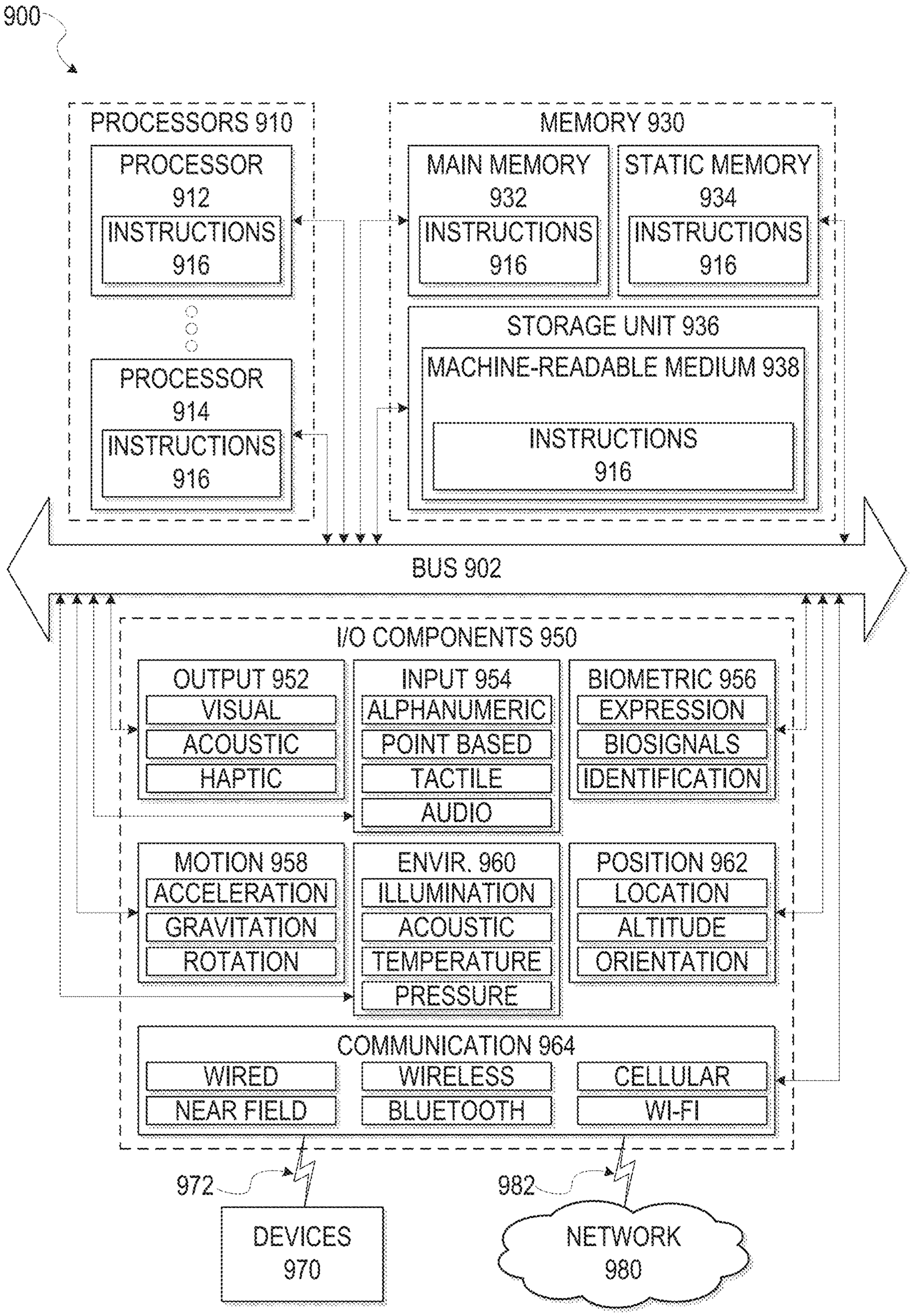
900
PROCESSORS 910
PROCESSOR 912
INSTRUCTIONS 916
PROCESSOR 914
INSTRUCTIONS 916
MEMORY 930
MAIN MEMORY 932
INSTRUCTIONS 916
STATIC MEMORY 934
INSTRUCTIONS 916
STORAGE UNIT 936
MACHINE-READABLE MEDIUM 938
INSTRUCTIONS 916
BUS 902
I/O COMPONENTS 950
OUTPUT 952
VISUAL
ACOUSTIC
HAPTIC
INPUT 954
ALPHANUMERIC
POINT BASED
TACTILE
AUDIO
BIOMETRIC 956
EXPRESSION
BIOSIGNALS
IDENTIFICATION
MOTION 958
ACCELERATION
GRAVITATION
ROTATION
ENVIR. 960
ILLUMINATION
ACOUSTIC
TEMPERATURE
PRESSURE
POSITION 962
LOCATION
ALTITUDE
ORIENTATION
COMMUNICATION 964
WIRED
NEAR FIELD
WIRELESS
BLUETOOTH
CELLULAR
WI-FI
972
DEVICES 970
982
NETWORK 980

FIG. 9

STORY AND SUB-STORY NAVIGATION

CLAIM OF PRIORITY

This application is a continuation of U.S. patent application Ser. No. 16/155,782, filed on Oct. 9, 2018, which is a continuation of U.S. patent application Ser. No. 14/704,212, filed on May 5, 2015, each of which are hereby incorporated by reference herein in their entireties.

BACKGROUND

News stories have traditionally been presented to consumers in a heavily controlled and ciliated format. Early formats for news presentation included newspapers and magazines. Later formats included broadcast radio and television news. Traditional news sources are typically heavily associated with corporations or well-known persons that gather and present the news stories. In the modern Internet era, many such news sources have fragmented, but core aspects of news gathering and presentation often remain associated with professional journalists gathering and sharing information in a way that is tied to an individual identity. While such practices have been able to support some news structures with valuable analysis, the process for generating stories where select professionals filter information and generate stories is time consuming and introduces significant delay between an event occurring and presentation of information to a news consumer.

Systems and methods described herein relate to automated local story generation, curation, and presentation from received content.

BRIEF DESCRIPTION OF THE DRAWINGS

Various ones of the appended drawings merely illustrate example embodiments of the present disclosure and should not be considered as limiting its scope.

FIG. **1** is a block diagram illustrating a networked system, according to some example embodiments.

FIG. **2**A illustrates aspects of server system operation receiving content for different geographic areas, in accordance with certain example embodiments.

FIG. **2**B illustrates aspects of server system operation sending different stories to different geographic areas, in accordance with certain example embodiments.

FIG. **2**C illustrates aspects of content origin areas and associated story visibility areas according to some embodiments.

FIG. **2**D illustrates aspects of content origin areas and associated story visibility areas according to some embodiments.

FIG. **3**A illustrates aspects of story generation, according to some example embodiments.

FIG. **3**B illustrates aspects of story generation, according to some example embodiments.

FIG. **3**C illustrates aspects of story generation, according to some example embodiments.

FIG. **4** is a flowchart illustrating aspects of a method, according to some example embodiments.

FIG. **5** illustrates aspects of a server system for automated local story generation and curation, according to some example embodiments.

FIG. **6** is a flowchart illustrating aspects of a method, according to some example embodiments.

FIG. **7** is a block diagram illustrating an example of a software architecture that may be installed on a machine, according to some example embodiments.

FIG. **8** illustrates an example user interface for a client device operating an application, according to some example embodiments.

FIG. **9** illustrates a diagrammatic representation of a machine in the form of a computer system within which a set of instructions may be executed for causing the machine to perform any one or more of the methodologies discussed herein, according to an example embodiment.

DETAILED DESCRIPTION

Systems and methods described herein relate to automated local story generation, curation, and presentation. Various embodiments described herein automatically generate stories from content received from different client devices such as smartphones. The stories are generated based on system trends and the characteristics of the received content. Story use trends may then be used to adjust how widely the story is available for viewing by system users.

"Content", as described herein, refers to one or more images, video clips, or multimedia clips captured by an electronic device, as well as any associated metadata descriptions. This includes metadata generated by an electronic device capturing an image or video, as well as metadata that may be associated later by other devices. A "piece of content" refers to an individual image or video clip captured by a client device. Content captured by such a client device may be sent individually via a network to other client devices as part of a social sharing network. A "content message" as referred to herein refers to the communication of content between one or more users via the system. Content may also be sent from a client device to a server system to be shared generally with other system users. Embodiments described herein relate to methods of grouping such public content from different sources into stories.

A "story" as described herein is a set of content. A story may be generated from pieces of content that are related in a variety of different ways, as is described in more detail throughout this document. For example, a "global" story is a story that is available to all of the users in a system. A "main" story is a story that is initially sent to an individual user based on a system's initial story generation process. A main story acts as an initial filter group of similar pieces of content that may be of interest to a user. A "sub-story" is a story that is sent to a user based on a selection of an image from a previous story. A sub-story includes pieces of content that share image characteristics with the selected image of the previous story.

An example system can operate by receiving pieces of content from smartphones or other client devices located all over the world. When content is received by the system, it is analyzed to determine location, time, and content details. Content details can be determined by machine vision analysis of content to identify objects and other details relating to the content. Image and video quality metrics can also be generated based on an automatic analysis. A set of content characteristics is then associated with the content based on the system analysis.

This example system then generates stories based on identified trends and the content characteristics for content in the system. The different stories are sent to different groups of client devices. Stories generated by a system may include a set of images and/or video clips selected based on:

(1) whether the pieces of content were generated within a certain proximity of each other or within a local area (e.g. within a particular geofence); (2) how recent the content is; (3) image quality metrics; and (4) shared content characteristics (e.g. content characteristics identified by machine vision such as cats, automobiles, sports, or other such content). Stories generated by the system are then assigned to one or more user segments. Users may be assigned to one or more user segments in a variety of ways. Some user segments may be based on user location, while other user segments may be based on user interest, such as an interest in sporting events, music, weather, pets, or any other such user or system identified interest areas. In various embodiments, this user segment for a story may be adjusted over time based on system trends associated with the content characteristics used to generate a story (e.g. a spike in activity from a baseline or average for a location, content category, or other characteristic indicating a newsworthy event). Similarly, such trends may be used to generate new stories having content associated with a system trend. A device will then receive access to stories that are associated with the device's user segment (e.g. a device's location or an interest group associated with the device's account). In certain embodiments, this results in a user receiving stories focused on high-quality recent pieces of content that are generated close to a user. Stories that are older or generated from content taken further away from a user's current location may be provided to a user based on identified system trends. Various different metrics or different combinations of metrics may be used to select the stories available for presentation on a particular client device.

In some example embodiments, content is received by a system and processed using machine vision to identify content characteristics. Rather than stories being generated automatically, a story tool (e.g. computing device or software tool) may be used by a system operator to select content for inclusion in a story. The story may then be made available to an initial user segment. Based on system feedback as described herein, the system may then adjust which user segments may view the system operator generated story by automatically making the story available to a greater number of client devices if system feedback identifies trends associated with the story based on viewing, screenshotting, and other metrics.

When a user accesses a story on the user's client device, the user can view the content as part of the story and select an individual piece of content from a story. When a piece of content is selected from the story, this selection is communicated to the system. The system then provides the device with a sub-story based on the content characteristics of the selected piece of content. This process can continue with the user selecting another piece of content from the sub-story, with a resulting subsequent sub-story being sent to the user's client device. A provided user interface allows a user to navigate back to any earlier viewed story, and to continue viewing additional pieces of content from the earlier story. At any point another piece of content can be selected, resulting in an additional sub-story associated with characteristics of the newly selected content.

In certain embodiments, anonymous information about story viewing, selection of pieces of content within an individual story, and screenshotting of content on a client device is fed back to the system to influence the system trends that impact how stories are assigned to user segments. This feedback mechanism can also be integrated with the system trends associated with incoming pieces of content mentioned above to influence the selection of pieces of content for future story generation (e.g. when a story is generated or not generated). In certain embodiments, the system trends may be used to adjust assigned user segments for a story based on geographic tiers. In one such embodiment, a global tier is the top tier of the system, encompassing the entire world. Below the global tier is a country tier, with the country tier divided into a geographic area for each country participating in the system. Below the country tier is the state tier, then a city tier, then a local tier, etc. When a story is generated by such a system, it is automatically assigned to a user segment for a local geographic area associated with the location where the content was generated. In other words, the story is initially available only to devices within the area where the pieces of content were generated. Based on the system trends, a story can be assigned or "moved up" the tiers to a higher tier area, so that the story is visible beyond the local geographic area where the content for the story were generated. At the highest global tier, a story may be visible to all devices in a system, or may be visible to the broadest user segment possible for a particular story. As a system identifies increasing interest in a story, the story is pushed up to higher and higher geographic tiers. As the system identifies decreasing interest in the category, the story will similarly be pushed down to lower geographic tiers.

Certain embodiments of such a system may periodically assess newly received content to determine which pieces of content best represent certain system categories associated with a story. As new content messages associated with a story are received by the system, they may be added to a story, or used to update or replace some previously received pieces of content in a story.

In a system that operates with geographic tiers, the number and type of stories for different users in different geographic areas can have a different mix of stories presented for selection in a user interface of an application operating on a device. One set of stories made available to a first client device in a first local area could include all local stories. Another set of stories available in a different local area could include eight local stories, four city stories, one state story, no country stories, and two global stories. In certain embodiments this mix of geographic representation in the stories available on a single device change over time and for different user segments in different local areas based on the particular characteristics of the pieces of content available to a system. Other embodiments may not use fixed geographic tiers, but may assign an area to a story based on content characteristics or metadata associated with content in a story. For example, in certain embodiments a set of content for a story may all occur within a 10 meter radius, and the system may determine that the story will only be of interest to users that are very close to this location. Rather than making the story available to all users within a larger geographic area, the system may automatically assign an area to the story, and may make the story available only to users in the area that was generated and assigned for that story.

As a particular example of a system using geographic tiers, in one embodiment a sports arena may be assigned its own local geographic area or geofence. During a basketball game at the arena, users capturing content inside the arena have the option of sending content messages to the system for public use in stories. The system analyzes the pieces of content received and generates one or more stories for the system users inside the arena. The system may, for example,

simply generate one story for the local geographic area that includes a mix of pictures and videos of the game and of fans attending the game.

If the game is particularly exciting the system may identify a trend. For example if the game is a playoff game that is tied with 10 seconds left, the system may see a spike in content messages sent from inside the arena for use in public stories. Based on this spike, a story from the arena is temporarily assigned a larger area (or higher tier), e.g., to state or national level visibility area, such that distant users within the new visibility area are provided access to the story from the arena. If interest in the game and the associated story remains high after the ending of the game, this story may remain at the higher tier, geographic visibility level based on viewing rates, screenshotting rates, or other system feedback received from client devices.

These metrics may be generated in different ways as a user navigates the system to view content within different stories. For example, if a user has access to the story from the arena, and the story includes a picture or video of a game-winning play from the arena, the user may select this content. The system then generates a sub-story for the user based on the characteristics of this content. For example, the generated sub-story may include pictures or videos showing gameplay highlights. If a user selects content from this sub-story showing a player dunking, a second sub-story may be generated and sent to this user showing pictures or videos of this player generally as well as other content showing dunks with other players. Selecting a piece of content from the second sub-story including the same player may result in a third sub-story that includes only content featuring the selected player. Selecting a second sub-story picture or video showing a different player dunking may result in an alternate third sub-story with content showing dunk highlights from the entire basketball season. Any screenshots of pictures or videos taken by the user, along with viewing time, percentage of pictures or video in a particular story viewed, or other such metrics can be sent to the system as feedback to establish baseline values for these metrics and to identify trends and influence a current user segment assignment for related stories as well as system operations for the generation of future stories.

FIG. **1** is a block diagram illustrating a networked system **100** according to some example embodiments. System **100** includes client device **110**, client device **120**, server system **150**, and network **140** that is used to convey communications between client devices **110** and **120** and the server system **150**. Client devices **110** and **120** may be any smartphone, tablet, phablet, laptop computer, network-enabled camera, or any other such network enabled device. Client devices **110**, **120** may include a camera device for capturing content, or may be coupled to a separate camera device that is used to capture the content prior to sending to other client device **110**, **120** for storage. Some embodiments may therefore include a wearable devices such as a pendant with an integrated camera that is coupled to a client device **110**, **120**. Other embodiments may include other associated devices with an integrated camera that may be wearable such as a watch, eyeglasses, clothing such as a hat or jacket with integrated electronics, a clip-on electronic device, or any other such devices that may communicate or be integrated with a client device **110**, **120**. Client devices **110** and **120** are connected to server system **150** via network **140**. The network **140** may include any combination of wired and wireless connections. This may include cellular access networks, access point interfaces to the internet, or any other such networks **140** or network elements. For example, client device **110** may interface with network **140** using a Long Term Evolution (LTE) cellular network to communicate with server system **150**, while client device **120** may use a Wi-Fi access point to interface with network **140** and communicate with server system **150**. Server system **150** may be one or more computing devices as part of a service or network computing system. In certain embodiments, particularly embodiments with large numbers of client devices **110**, **120** interfacing with a server system **150** from widely different locations all over the globe, server system **150** may be a distributed network **140** of server computers that are similarly widely distributed, and which communicate with each other via network **140**. In some embodiments, client devices **110** and **120**, as well as and any elements of server system **150** and network **140**, may be implemented using elements of software architecture **702** or machine **900** described in FIGS. **7** and **9**.

Networked system **100** then may be used in communication of content messages from client devices **110**, **120** to a system **150**, and communication of stories from the system **150** to the client devices **110**, **120**. As shown in FIG. **1**, client device **110** communicates content message **112** to server system **150**, and client device **110** receives stories **114** from server system **150**. In addition to this functionality used for the embodiments described herein, client device **110** may additionally receive private pieces of content and communications from other users, and may convey a personal story to server system **150**, with the personal story including images and or video from content messages **112** generated by client device **110** or another device coupled to client device **110**. Similarly, client device **120** sends content messages **122** and receives stories **124**, and may additionally perform other actions.

FIG. **2**A illustrates aspects of server system **250** receiving content messages from different geographic areas in accordance with certain example embodiments. FIG. **2**B illustrates aspects of server system **250** sending different stories to different geographic areas in accordance with certain example embodiments. FIGS. **2**C and **2**D illustrate how different stories may be assigned different visibility areas. In contrast to FIG. **1** that shows two client devices **110** and **120**, FIGS. **2**A-D show an abstract of the client side of a system where thousands or millions of client devices **110**, **120** in different areas may be interacting with a server system **250**.

Instead of individual client devices **110**, **120**, FIGS. **2**A and **2**B show a simple user segment representation with two local geographic areas **204** and **206**, which are the lowest tier areas in this example. State geographic area **202** is one tier above local geographic areas **204** and **206**, and state geographic area **202** encompasses these two local areas. This is a simplified representation for example purposes. Other embodiments may include many more tiers, and large numbers of adjacent lowest tier local geographic areas. As described above, one embodiment may include a local tier, a city tier, a regional tier, a state tier, a national tier, and a top level global tier. A lowest level local tier may be made up of local geographic areas of widely varying size and shape. A single local geographic area may be a public park, multiple city blocks, a university campus, a sports area, a shopping mall, a beach, a single building, or any such local area. In certain embodiments, geofences are used to define local areas. Such geofences may be tracked by aspects of a network system **100** including location systems within client devices such as client devices **110** and **120**, network based location systems as part of network **140**, separate location systems such as global positioning systems (GPS), or any combination of these or other location systems.

In other embodiments, rather than considering set geofences or groups of users, a system may generate stories for each client device individually. In such an embodiment, whenever a user navigates to a stories interface within an application operating on a client device, the client device communicates a current location to the server system **250**. The location of the device or other device provided information at that time can be used to generate a list of stories for the device.

In the illustrated example of FIG. **2**A, the client devices within first local geographic area **204** are grouped together and communicate 1000 content messages **260** to server system **250** in a first time period. The content associated with these content messages is shown as SF**1** through SF**1000**. During the same time period, 10000 content messages **262** containing individual clips or images are sent to server system **250** by client devices within the second local geographic area **206**, illustrated as content LA**1** through LA**10000**. This volume of content is sufficient to overwhelm an individual user. Therefore, server system **250** operates as a curator to filter the content messages and provide a select set of the pictures and videos from the content messages as one or more stories.

In various embodiments, this curation function may be fulfilled by a server system **250** in different ways. At a high level, one example embodiment segments users by local area. Stories for a client device **110**, **120** are generated from the most recent content messages that were generated in the client device's current local area. Such local content messages for a story can further be filtered based on image quality and image content. Image content may be used to prevent excess content duplication, to provide a variety of different content, to provide content identified as newsworthy (e.g. images associated with famous people), or based on any other such content filtering selections. Image content may also be analyzed to identify content duplication, and to avoid placing extremely similar content (e.g. videos of the same event from similar angles) in a single story. Additionally, the server system **250** can analyze trends associated with incoming content messages from other local areas to generate stories based on the trends identified by the system. Additional details related to server curation and story generation are discussed below with respect to FIG. **6**.

FIG. **2**B then illustrates a first story set **292** being made available to all client devices within the first local geographic area **204**. Similarly, second story set **294** includes stories visible to all client devices within the second local geographic area **206**. Second story set **294** is shown as including three stories, with all three stories generated from content messages originating in the second local geographic area **206**. These stories of the second story set include LA stories **291**-**293**. First story set **292** is shown as including two stories generated from content messages originating within local geographic area **204**, SF story **281** and SF story **282**. First story set **292** also includes a story generated from content messages originating within local geographic area **206**, LA story **291**. As described above, LA story **291** may be identified by server system **250** analyzing system trends, where a larger than normal number of story views, screenshots, incoming additional content messages, or other system trends identify LA story **291** as a story to be made visible to a larger user segment.

FIG. **2**C illustrates an example embodiment of how another story can be generated by server system **250** and made available to different user segments over time. As illustrated by FIG. **2**C, content messages are received from content origin area **260** and are used to generate first story **261**. At an initial time T**1** when story **261** is first made available to system devices, the story is only visible to devices within T**1** story visibility area **262**, which is essentially the same area as the content origin area **260** where the content messages originated. Over time, the server system **250** identifies feedback baseline values that are used to establish system trends that deviate from baseline values and thus indicate interest in certain content. The server system **250** continuously expands the visibility area associated with the first story **261** based on such trends. At a second time T**2**, the story is visible in a regional area, shown as T**2** story visibility area **264**. At time T**3**, the first story **261** is visible at a state level, shown as T**3** story visibility area **266**. At time T**4**, the story **261** is visible to all devices at a country level, shown as T**4** story visibility area **268**. For example, such a story expansion over time may occur if a music festival with popular bands is taking place in content origin area **260**, with a spike in content messages from that area occurring during the festival. Analysis by server system **250** identifies the spike in content messages, and automatically generates a story with pictures and video identified by machine vision as being content from the festival. The story is initially only visible in the local area, but is frequently viewed and screenshotted, and so is promoted to a regional/city story. The festival story is similarly popular as a regional story, and is promoted again to be a state story, and then promoted again to be a, national story, so that anyone in the United States is able to view the story. After a certain amount of time, the story may be removed from the system and replaced with other stories. In some embodiments, this may occur with system trends determining that the story is less popular, and moving the story back down through the tiers until it is back to being a local story. In other embodiments, the story may simply be removed from the system after a certain period of time has passed.

By contrast, FIG. **2**D illustrates aspects of an embodiment for stories where the user segment does not change over time. FIG. **2**D shows that the content origin area **260** is also the local area where content messages originate for a second story **271**. System baseline values and trends determine, however, that an insufficient level of interest is generated and thus the second story **271** is not promoted to a larger area. As a result, for times T**1** through T**4**, the visibility area for second story **271** remains the same area. For example, if a water main breaks, resulting in a sudden spike of content messages from a flooded area near the break, the system may analyze the spike of related incoming content messages and automatically generate a story associated with the water main break. If the story does not generate sufficient interest to be promoted, the visibility area will remain the local area around where the content is captured, and only local viewers will have access to view the second story **271**. This story will then eventually be replaced by other stories, and will be removed from the system.

Third story **275** accepts content from the entire national area as content origin area **274** and maintains this national area as T**1**-T**4** third story visibility area **276**. For example, on a national holiday such as the 4th of July in the United States, all content messages received in content origin area **274** may be processed using machine vision to identify fireworks images or other holiday images. Such a story may be triggered by a calendar event or a system setting matched to the holiday, or such a story may be generated in response to the system identifying a trend or a set of content messages meeting certain thresholds for generation of a national story. These content messages may automatically be used to

generate third story **275**, and third story **277** is visible from the entire national area during the holiday.

As mentioned above, the stories available to a device vary over time, and different sets of stories are available to different devices. In the example embodiment of FIGS. **2**C and **2**D, at time T**1**, devices outside T**1** story visibility area **262** are able to view third story **277**, but not first story **261** or second story **271**, while devices inside area **262** are able to view all three of these stories. This changes over time, and at time T**4**, all users can view first story **261** and third story **271**, but only users within area **262** are still able to view all three of these stories. Additionally, other stories may be provided to different devices, such that some additional stories may be available to users in other local geographies that are not available in T**1** story visibility area **262**. Similarly, story sets **292** and **294** are each illustrated as including three stories. In various embodiments, the story set available to a device at a particular time may include any number of stories. In certain embodiments, a maximum number of stories may be enforced by a server system **250**, while in other embodiments, any number of stories meeting system thresholds for story generation and presentation may be offered to a user at any given time.

FIG. **3**A illustrates an embodiment of a user interface for a client device **300**. Client device **300** shows user selectable interface areas **301** for each story in first story set **292**, including SF story **281**, SF story **282**, and LA story **291**. Additional stories interface areas may be provided by scrolling up and down. Each interface area may provide basic details or sample images associated with each story. In certain embodiments a story or part of a story may be provided to client device **300** prior to a selection of an interface area **301**. In other embodiments, images of a story are communicated from a server system such as server system **250** following selection of a particular interface area **301**.

FIG. **3**C illustrates one embodiment of an interface for viewing stories and sub-stories such as the stories shown in FIG. **3**B. In FIG. **3**C, when a story or sub-story is received for viewing on device **300**, an individual piece of content is displayed within content viewing area **397**. In the embodiment of FIG. **3**C, a user has navigated to content LA **84** (either image or video) of second sub-story **320**. Input areas are visible for a return to previously navigated stories. As shown, input **398** is available to switch to LA story **291**, and input **399** is available to switch to first sub-story **310**. If either input **398** or **399** is selected, the first picture or video of the selected story will be displayed within content viewing area **397**. The viewer may then view some or all of the pieces of content within a story, and may either navigate to a new sub-story by selecting the picture or video displayed in content viewing area **397**, or may return to a previous story. In further embodiments, a user may navigate between various stories and sub-stories using other user interface inputs. For example, a user in a sub-story may swipe up on content displayed on a device to return to a previously viewed story in some embodiments. Similarly, if a user has previously navigated back to a previously viewed story by swiping up, some embodiments may enable a swipe down user input to navigate to a sub-story. Other embodiments may use drop-down menus or menu lists of recently viewed stories that are accessed by a physical button on a client device to enable navigation between multiple different stories and sub-stories.

FIG. **3**B then illustrates aspects of story generation according to some example embodiments. After a story is selected by a user interface action with an interface area **301**, a story is displayed on client device **300**. A user may then view various stories and sub stories. FIG. **3**B shows LA story **291**, which may be selected from the interface area **301** of FIG. **3**A. Following such a selection, pieces of content from LA story **291** may be viewed. As illustrated, LA story **291** includes images or videos from content messages including content LA **7**, LA **55**, and LA **986-989**. As an image from content LA **55** is displayed on a screen of device **300**, the user may select the image from content LA **55**. This selection is communicated from client device **300** to a server system, and the server system responds with first sub-story **310**. First sub-story **310** includes videos or images from content LA **50**-LA **57** having characteristics similar to one or more characteristics of content LA **55**. After viewing some or all images of first sub-story **310** in an interface similar to the interface shown in FIG. **3***c*, the user may navigate back to LA story **291**. When viewing video LA**7**, the user may then select image LA **7**, and second sub-story **320** will be received from the server system in response to the selection of image LA **7**. The user may then view some or all videos or images from content messages LA **80** through LA **84** of second sub-story **320** before navigating back to viewing the content of LA story **291**.

For example, if LA story **291** includes videos of flooding and image LA **55** shows flood water in a local geographic area, a communication of this selection is sent to server system **250**. Server system **250** then responds with a first sub-story **310** having content that share content characteristics with the selected image LA **55**. In this case, all content associated with content messages LA **50** through LA **57** may include pictures or videos showing a specific area from different angles, as well as older pictures or videos of the specific area before the flooding occurred.

The user may then return to the original story to continue viewing content in LA story **291**, and may select an additional image or video within LA story **291**. If the user then selects a video from content message LA **7** of a dog walking through the flood water of the event that initiated the creation of LA story **291**, then this selection is communicated to server system **250**, and the server system **250** responds with second sub-story **320**. Based on the video of the dog and the flood water images from content messages, LA**80**-LA**84** may include images or videos of dogs. This process can be recursive, such that a user can then select an image or video within a sub-story, and receive an additional sub-story. For example, if a user selects an image or video from content communication LA**80** showing a particular type of dog, then another sub-story may be received including content including that type of dog from different times or from other areas. If a user selects a piece of content from content communication LA**84** showing a video of dogs playing around flood water, then another sub-story may be generated showing only dog content with dogs playing around water. Additional details related to selection of content for sub-stories are discussed below with respect to FIG. **6**.

FIG. **4** is a flowchart illustrating aspects of a method **400**, according to some example embodiments. For illustrative purposes, method **400** is described with respect to networked system **100** of FIG. **1**. It is to be understood that method **400** may be practiced with other system configurations in other embodiments.

In operation **404**, a server system **150** receives content messages **112**, **122** from a client device **110**, **120** via network **140**. In operation **406**, the content received in operation **404** is processed to identify content characteristics. This operation **406** may identify a time at which the content was

generated, a location where it was generated, or other associated time and location information. If more than one piece of content (e.g. multiple video clips or pictures) are received, then a time period may be identified. Server system **150** may also include a machine vision module which is configured to identify objects within the content. In certain embodiments, a machine vision module may include a dictionary of objects and object arrangements. Based on the objects and/or object arrangements identified by the machine vision module, one or more values may then be assigned as content values as part of a set of characteristics associated with the piece of content by the processing of operation **406**. Additionally, image or video quality values may be assigned to content. Such values may include blurriness values, brightness values, color profile values, contrast values, or any other such quality values. In embodiments where content include video clips having different frame rates or other characteristics unique to video clips, this information may also be used to assign quality values as part of a set of content characteristics.

In operation **408**, the content received in operation **404** is processed with other incoming pieces of content to identify system trends. For example, a server system **150** may keep a record of image content values assigned by system processing, and how frequently (e.g. a content receipt rate) content with a particular content value is received. Such frequency and receipt rate metrics may be maintained anonymously by server system **150** for any content characteristic values, and used to establish expected baseline values that are associated with normal system activity for particular dates, times, events, or other periods that may be identified within a system. When the server system **150** identifies a spike (e.g. a variation from the expected baseline) in a receipt rate of content associated with a particular content characteristic value, this can be identified by the server system **150** as a system trend. Selection of particular pieces of content as part of story viewing may also be tracked by a system. When the server system **150** receives user selections associated with a piece of content and sends an associated sub-story to a client device, this may be tracked to determine system trends. If a particular piece of content is selected frequently, this information may be used as system feedback for selecting the piece of content for future stories, or for including it in stories for a larger geographic area. In various embodiments, an application operating on a client device may also gather information about how a user interacts with certain pieces of content or stones. For example, the application may record how frequently or for how long a particular story or piece of content within a story is viewed. The application may also track how many images or videos within a story are viewed prior to the user navigating away from a story. This information may be collected and sent to server system **150** for use in determining trends. For all of the above, in different embodiments, server **150** may use different statistical analyses with associated thresholds or criteria to trigger the identification of a system trend.

In operation **410**, the system trends identified in operation **408** and the individual content characteristics for the piece of content identified in operation **406** are used to determine if a story should be generated or updated.

If a story is being generated for the first time, a user segment or visibility area is assigned to the story. This may involve an identification at server system **150** of user segments with shared characteristics to be used for story segmentation. This may simply involve assigning a story as visible within a geofence where content from the story originated. Grouping users reduces processing loads on server system **150** by reducing processing resources needed to determine which stories are available to which devices. In other embodiments, stories may be generated on a per client device basis, without such user segments. In such embodiments, stories may be considered individually curated for single client devices **110**, **120**. One example embodiment of a user segment is a user segment based on area tiers as described above. In other embodiments, user segments may be based on system supported interest groups. For example, the system may allow a user to indicate an interest in sports. In such an example, basketball, football, soccer, baseball, hockey may correspond to the higher level tiers, with different leagues and/or levels corresponding to lower level tiers. When stories containing content related to basketball are generated, a user's device may be provided access to that story regardless of where the user's device is located. In some embodiments, this interest indication may be used as system trend data to trigger the system to generate more stories related to basketball.

If a story is being updated, then feedback information received at server system **150** is analyzed to determine if a story should be more widely available or less widely available based on system metrics for story visibility.

In some embodiments, a user provides one or more system settings to identify categories that a user is interested in. These categories are then used by the system to identify user segments, which are groups of users that have expressed interest in shared categories or are otherwise grouped together by the system. The system can independently generate story sets for a user's devices based on category selections. In other embodiments, content viewing characteristics associated with a client device or a user account may be used to generate or update interest profiles. This information may be used not only to generate story sets for the user and other users with similar profiles, but this information may also be used as system feedback for determining trends in the system. Other embodiments may particularly exclude the use of individual device or account profiles for privacy purposes, and may only use data received from client devices that is stored anonymously.

Additionally, in some embodiments as new content is received that is associated with categories that were used to generate a story, then the pieces of content for a story may be adjusted. In certain embodiments, new content is appended to the end of a story. In other embodiments, content may be both added and removed from a story based on threshold values for inclusion in a particular story. When a story is generated or updated as part of operation **410**, the new story is made available to individual client devices **110**, **120**. In some embodiments, the communication of the story to a particular client device **110**, **120** may occur automatically as part of a push from server system **150** to the client device **110**, **120**. In other embodiments, a client device **110**, **120** generates a request for a story as part of application operations at the client device **110**, **120**. For example a user navigating to a story interface within an application may automatically generate a request from the client device **110**, **120** to server system **150** for the main story associated with the client device's **110**, **120** user segment.

Operations **404** through **410** will repeat during system operation. In certain embodiments, a server system **150** may aggregate content over a set period of time, or may aggregate a set number of pieces of content before processing the content and updating a story or generating a new story. In other embodiments, updates and new stories for a user segment may occur only when a client device **110**, **120**

associated with a user segment requests a list of available stories. In further embodiments, criteria associated with incoming content may be used to trigger an update or new story generation. For example, during periods when large numbers of content messages are received that are related with categories or events identified as trending, a new story or a story update may be triggered. In other embodiments, various combinations of these update periods and triggers may be used, along with any other possible criteria for initiating an update to a story.

As these operations above repeat to generate new stories and update existing stories, a client device **110**, **120** may periodically send a communication to server system **150** identifying a user selection of a picture or video with a story, as illustrated by operation **412**. After receipt of such communication in operation **412**, in operation **414** a sub-story is identified by the server system **150**, with the sub-story containing content sharing content characteristics with the selected picture or video. This sub-story may be generated as the request is received, or may be generated by the system as the piece of content is initially placed in a story. The sub-story is then communicated to the client device **110**, **120** that sent the communication. This process of operations **412** through **416** may similarly repeat with the client device **110**, **120** selecting different pieces of content or navigating to previously received stories, and the server system **150** communicating the associated stories and content to the client device **110**, **120**.

FIG. **5** illustrates aspects of a server system **550** for automated local story generation and curation, according to some example embodiments. In various embodiments, server system **550** may be used as an implementation of server system **150** or server system **250**. The example server system **550** includes input and output (I/O) module **552**, content characteristic analysis module **554**, machine vision module **556**, content characteristic database **558**, trend analysis module **560**, and story generation module **562**.

I/O module **552** may include any hardware, firmware, or software elements needed to send and receive content and stories to client devices **110**, **120** via a network **140**. Content characteristic analysis module **554** may include devices, processors, and software to analyze images from pictures and frames of video clips, and then determine content characteristics, including details about when and where a picture or video was generated. In certain embodiments, content characteristic analysis module **554** may be implemented as a plurality of different modules, each analyzing a different content characteristic, including any content characteristic described herein.

Machine vision module **556** describes a particular module that may be used to identify content characteristics based on the content of an image or images in a video. Machine vision module **556** includes hardware, firmware, and/or software for analyzing and understanding content. In one embodiment, machine vision module **556** is associated with a dictionary comprising image and video content values. Objects identified in images of a piece of content and the arrangement of the identified objects therein may be used by machine vision module **556**, in such an embodiment, to select one or more content values from the dictionary as content characteristics. For example, a simple such machine vision module **556** may identify a ball in an image, and select the values ball and game as content characteristics. A more complex module may identify the type of ball as a basketball, and include "basketball" as a characteristic value. A still more complex machine vision module **556** may identify a basketball, a crowd, a court color, and an elevated perspective of the court to identify "professional basketball game" and "basketball arena" as content values for the content. The same complex machine vision module **556** may identify a basketball, a park background, and a concrete court surface and associate "amateur basketball game" and "playground basketball" as content values for the content.

These content values generated by machine vision module **556** can then be stored in content characteristic database **558** along with other characteristic values. Such characteristic values can include: one or more content values (i.e., an identification of what's in the content); a generation time; a generation time period; a generation location; a generation area; one or more quality values, any metadata value associated with content, an identifier for a particular piece of content, or any other such values. In some embodiments, a copy of content may be stored in content characteristic database **558** with location information, capture time information, and any other such information about a piece of content. In certain embodiments, content characteristic database **558** may anonymously store details about content use. For example, client devices **110**, **120** can communicate details about presentation of the content on a screen of the device, and about screenshots taken of the content. Anonymous metrics about how often a piece of content is viewed as part of a story, how long the content is viewed for, and how frequently screenshots are taken may then be measured by server system **550**, as part of analysis by content characteristic analysis module **554**, with the resulting data stored in content characteristic database **558**.

Trend analysis module **560** may then use details from content characteristic database **558** to identify patterns associated with content characteristics. Trend analysis module **560** may track how frequently machine vision module **556** associates content with the content value "basketball." Trend analysis module **560** can also track content characteristics associated with location, times of day, times of year, holidays, and other such characteristics in addition to content characteristics. Further, multiple characteristics may be tracked together to identify complex patterns.

Story generation module **562** may then use information about pieces of content from content characteristic database **558** as well as information about trends from trend analysis module **560** to select particular pictures or videos for an automatically generated story. In various embodiments, story generation module **562** may use complex scoring, weighting, and other rules in generating a story. For example, certain embodiments may require that all pieces of content meet a quality threshold unless a trend having certain threshold characteristics is identified and all content associated with the trend are below the quality threshold. Another embodiment may weight story generation based on a number of stories currently available in a local geographic area. In still further embodiments, any number of complex rules may be applied together as part of story generation to filter images and videos for a story based on time, location, content, and quality.

Similarly, when a user selects a piece of content in a story, if a single input is provided, the system may select content for a sub-story using similar rules. For example, if a selected piece of content is associated with six different content characteristics, the system may attempt to provide images or videos for the sub-story having a variety of each of the six different content characteristics. Selection of a piece of content in the sub-story that shares two of the original six characteristics may then result in a second story that includes content having those two shared characteristics. Certain embodiments may allow content in sub-stories to be

older or further away from a requesting client device **110**, **120**, while other systems may maintain strict limits on how far away and how recently pieces of content were generated. In certain embodiments, content selection may provide a user interface listing content characteristics, and a user may select which content characteristics are to be used to generate a sub-story.

FIG. **6** is a flowchart illustrating aspects of a method **600**, according to some example embodiments. Method **600** is a method performed by a server system **550**. For the purposes of illustration, method **600** is described with respect to server system **550**. In other embodiments, method **600** may be performed by various other server system implementations.

Method **600** begins with operation **602** receiving, at an I/O module **552** of server system **550**, a plurality of communications from a plurality of client devices **110**, **120**. Each communication includes a piece of content, a location associated with the content, and a time associated with the content.

Operation **604** then involves processing, by the content characteristic analysis module **554** of the server system **550**, each content communication from the plurality of communications to determine a set of content characteristics for each piece of content.

Operation **606** then involves generating, using a story generation module **562** of server system **550**, at least a first story set **292**, where the first story set **292** includes a first plurality of content from the plurality of communications, and where the first plurality of content for the first story set **292** are selected based on the set of content characteristics for each piece of content of the first plurality of content. In certain embodiments, content characteristics are additionally identified using machine vision module **556** to identify content values. Additional embodiments of method **600** may also involve performing a trend analysis associated with one or more content characteristic values using trend analysis module **560**, and a story may be generated based on trend analysis and content characteristics.

While method **400** and method **600** each present a set of operations in a particular order, each of these methods may be implemented with operations in different orders, or with additional operations included between the described operations. Other methods, including a variety of other system implementations and operations, are also possible in other embodiments.

FIG. **7** is a block diagram **700** illustrating architecture of software **702**, which can be installed on any one or more of the devices described above. For example, in various embodiments, client devices **110** and **120** and server systems **150**, **250**, and **550** may be implemented using some or all of the elements of software **702**. FIG. **7** is merely a non-limiting example of a software architecture, and it will be appreciated that many other architectures can be implemented to facilitate the functionality described herein. In various embodiments, the software **702** is implemented by hardware such as machine **900** of FIG. **9** that includes processors **910**, memory **930**, and I/O components **950**. In this example architecture, the software **702** can be conceptualized as a stack of layers where each layer may provide a particular functionality. For example, the software **702** includes layers such as an operating system **704**, libraries **706**, frameworks **708**, and applications **710**. Operationally, the applications **710** invoke application programming interface (API) calls **712** through the software stack and receive messages **714** in response to the API calls **712**, consistent with some embodiments.

In various implementations, the operating system **704** manages hardware resources and provides common services. The operating system **704** includes, for example, a kernel **720**, services **722**, and drivers **724**. The kernel **720** acts as an abstraction layer between the hardware and the other software layers, consistent with some embodiments. For example, the kernel **720** provides memory management, processor management (e.g., scheduling), component management, networking, and security settings, among other functionality. The services **722** can provide other common services for the other software layers. The drivers **724** are responsible for controlling or interfacing with the underlying hardware, according to some embodiments. For instance, the drivers **724** can include display drivers, camera drivers, BLUETOOTH® or BLUETOOTH® Low Energy drivers, flash memory drivers, serial communication drivers (e.g., Universal Serial Bus (USB) drivers), WI-FI® drivers, audio drivers, power management drivers, and so forth.

In some embodiments, the libraries **706** provide a low-level common infrastructure utilized by the applications **710**. The libraries **706** can include system libraries **730** (e.g., C standard library) that can provide functions such as memory allocation functions, string manipulation functions, mathematic functions, and the like. In addition, the libraries **706** can include API libraries **732** such as media libraries (e.g., libraries to support presentation and manipulation of various media formats such as Moving Picture Experts Group-4 (MPEG4), Advanced Video Coding (H.264 or AVC), Moving Picture Experts Group Layer-3 (MP3), Advanced Audio Coding (AAC), Adaptive Multi-Rate (AMR) audio codec, Joint Photographic Experts Group (JPEG or JPG), or Portable Network Graphics (PNG)), graphics libraries (e.g., an OpenGL framework used to render in two dimensions (2D) and three dimensions (3D) in a graphic content on a display), database libraries (e.g., SQLite to provide various relational database functions), web libraries (e.g., WebKit to provide web browsing functionality), and the like. The libraries **706** can also include a wide variety of other libraries **734** to provide many other APIs to the applications **710**.

The frameworks **708** provide a high-level common infrastructure that can be utilized by the applications **710**, according to some embodiments. For example, the frameworks **708** provide various graphic user interface (GUI) functions, high-level resource management, high-level location services, and so forth. The frameworks **708** can provide a broad spectrum of other APIs that can be utilized by the applications **710**, some of which may be specific to a particular operating system **704** or platform.

In an example embodiment, the applications **710** include a home application **750**, a contacts application **752**, a browser application **754**, a book reader application **756**, a location application **758**, a media application **760**, a messaging application **762**, a game application **764**, and a broad assortment of other applications such as a third party application **766**. According to some embodiments, the applications **710** are programs that execute functions defined in the programs. Various programming languages can be employed to create one or more of the applications **710**, structured in a variety of manners, such as object-oriented programming languages (e.g., Objective-C, Java, or C++) or procedural programming languages (e.g., C or assembly language). In a specific example, the third party application **766** (e.g., an application developed using the ANDROID™ or IOS™ software development kit (SDK) by an entity other than the vendor of the particular platform) may be mobile software running on a mobile operating system such as IOS™,

ANDROID™, WINDOWS® Phone, or another mobile operating system. In this example, the third party application **766** can invoke the API calls **712** provided by the operating system **704** to facilitate functionality described herein.

Some embodiments may particularly include a story application **767**. In certain embodiments, this may be a stand-alone application that operates to manage communications with a server system such as server system **150**. In other embodiments, this functionality may be integrated with another application such as a social media application **760** or another such application. Story application **767** may manage collection of content using a camera device of machine **900**, communication with a server system via I/O components **950**, and receipt and storage of received stories in memory **930**. Presentation of content and user inputs associated with content may be managed by story application **767** using different frameworks **708**, library **706** elements, or operating system **704** elements operating on a machine **900**.

FIG. **8** illustrates an example mobile device **800** executing a mobile operating system (e.g., IOS™, ANDROID™, WINDOWS® Phone, or other mobile operating systems), consistent with some embodiments. Mobile device **800** may implement software architecture **702** in certain embodiments. In one embodiment, the mobile device **800** includes a touch screen operable to receive tactile data from a user. The illustrated embodiment of mobile device **800** shows a plurality of images or videos presented as part of a story, with each piece of content have additional associated options and information. FIG. **8** particularly shows content **801** and associated information **802**. For example, content **801** may be similar to content LA7. Associated information **802** may include multiple different details or content characteristics associated with content **801**. A user selecting content **801** to generate a sub-story may select from the content characteristics or provide additional information related to the desired characteristics for a sub-story based on additional information **802** associated with content **801**. The user may physically touch the mobile device **800**, and in response to the touch, the mobile device **800** may determine tactile data such as touch location, touch force, or gesture motion. This input may then be sent to a server system to generate a sub-story and communicate the sub-story back to mobile device **800**. In various example embodiments, the mobile device **800** displays a home screen operable to launch applications **710** or otherwise manage various aspects of the mobile device **800**. In some example embodiments, the home screen provides status information such as battery life, connectivity, or other hardware statuses. The user can activate user interface elements by touching an area occupied by a respective user interface element. In this manner, the user interacts with the applications **710** of the mobile device **800**. For example, touching the area occupied by a particular icon included in the home screen causes launching of an application **710** corresponding to the particular icon.

In certain embodiments, content may be presented within the touch screen of mobile device **800** operating as a client device **110**, **120**, and a touch input may be used to initiate a communication to a server system **550** to request a sub-story, as described above.

Many varieties of applications **710** (also referred to as "apps") can be executing on the mobile device **800**, such as native applications (e.g., applications programmed in Objective-C, Swift, or another suitable language running on IOS™, or applications **710** programmed in Java running on ANDROID™), mobile web applications (e.g., applications **710** written in Hypertext Markup Language-5 (HTML5)), or hybrid applications (e.g., a native shell application **710** that launches an HTML5 session). For example, the mobile device **800** includes a messaging app, an audio recording app, a camera app, a book reader app, a media app, a fitness app, a file management app, a location app, a browser app, a settings app, a contacts app, a telephone call app, or other apps (e.g., gaming apps, social networking apps, biometric monitoring apps). In another example, the mobile device **800** includes a social messaging app such as SNAPCHAT® that, consistent with some embodiments, allows users to send public content to a server system **550**, and to receive stories from the server system **550**. Such an SNAPCHAT application **710** may additionally enable exchange private ephemeral image and/or video content messages.

FIG. **9** is a block diagram illustrating components of a machine **900**, according to some embodiments, able to read instructions from a machine-readable medium (e.g., a machine-readable storage medium) and perform any one or more of the methodologies discussed herein. Specifically, FIG. **9** shows a diagrammatic representation of the machine **900** in the example form of a computer system, within which instructions **916** (e.g., software, a program, an application **710**, an applet, an app, or other executable code) for causing the machine **900** to perform any one or more of the methodologies discussed herein can be executed. In alternative embodiments, the machine **900** operates as a standalone device or can be coupled (e.g., networked) to other machines. In a networked deployment, the machine **900** may operate in the capacity of a server machine **550** or a client machine **110**, **120** in a server-client network environment, or as a peer machine in a peer-to-peer (or distributed) network environment. The machine **900** can comprise, but not be limited to, a server computer, a client computer, a personal computer (PC), a tablet computer, a laptop computer, a netbook, a set-top box (STB), a personal digital assistant (PDA), an entertainment media system, a cellular telephone, a smart phone, a mobile device **800**, a wearable device (e.g., a smart watch), a smart home device (e.g., a smart appliance), other smart devices, a web appliance, a network router, a network switch, a network bridge, or any machine capable of executing the instructions **916**, sequentially or otherwise, that specify actions to be taken by the machine **900**, Further, while only a single machine **900** is illustrated, the term "machine" shall also be taken to include a collection of machines **900** that individually or jointly execute the instructions **916** to perform any one or more of the methodologies discussed herein.

In various embodiments, the machine **900** comprises processors **910**, memory **930**, and I/O components **950**, which can be configured to communicate with each other via a bus **902**. In an example embodiment, the processors **910** (e.g., a central processing unit (CPU), a reduced instruction set computing (RISC) processor, a complex instruction set computing (CISC) processor, a graphics processing unit (GPU), a digital signal processor (DSP), an application specific integrated circuit (ASIC), a radio-frequency integrated circuit (RFIC), another processor, or any suitable combination thereof) include, for example, a processor **912** and a processor **914** that may execute the instructions **916**. The term "processor" is intended to include multi-core processors **910** that may comprise two or more independent processors **912**, **914** (also referred to as "cores") that can execute instructions **916** contemporaneously. Although FIG. **9** shows multiple processors **910**, the machine **900** may include a single processor **910** with a single core, a single processor **910** with multiple cores (e.g., a multi-core pro-

cessor **910**), multiple processors **912**, **914** with a single core, multiple processors **910**, **912** with multiples cores, or any combination thereof.

The memory **930** comprises a main memory **932**, a static memory **934**, and a storage unit **936** accessible to the processors **910** via the bus **902**, according to some embodiments. The storage unit **936** can include a machine-readable medium **938** on which are stored the instructions **916** embodying any one or more of the methodologies or functions described herein. The instructions **916** can also reside, completely or at least partially, within the main memory **932**, within the static memory **934**, within at least one of the processors **910** (e.g., within the processor's cache memory), or any suitable combination thereof, during execution thereof by the machine **900**. Accordingly, in various embodiments, the main memory **932**, the static memory **934**, and the processors **910** are considered machine-readable media **938**.

As used herein, the term "memory" refers to a machine-readable medium **938** able to store data temporarily or permanently and may be taken to include, but not be limited to, random-access memory (RAM), read-only memory (ROM), buffer memory, flash memory, and cache memory. While the machine-readable medium **938** is shown, in an example embodiment, to be a single medium, the term "machine-readable medium" should be taken to include a single medium or multiple media (e.g., a centralized or distributed database, or associated caches and servers) able to store the instructions **916**. The term "machine-readable medium" shall also be taken to include any medium, or combination of multiple media, that is capable of storing instructions (e.g., instructions **916**) for execution by a machine (e.g., machine **900**), such that the instructions **916**, when executed by one or more processors of the machine **900** (e.g., processors **910**), cause the machine **900** to perform any one or more of the methodologies described herein. Accordingly, a "machine-readable medium" refers to a single storage apparatus or device, as well as "cloud-based" storage systems or storage networks that include multiple storage apparatus or devices. The term "machine-readable medium" shall accordingly be taken to include, but not be limited to, one or more data repositories in the form of a solid-state memory (e.g., flash memory), an optical medium, a magnetic medium, other non-volatile memory (e.g., erasable programmable read-only memory (EPROM)), or any suitable combination thereof. The term "machine-readable medium" specifically excludes non-statutory signals per se.

The I/O components **950** include a wide variety of components to receive input, provide output, produce output, transmit information, exchange information, capture measurements, and so on. In general, it will be appreciated that the I/O components **950** can include many other components that are not shown in FIG. **9**. The I/O components **950** are grouped according to functionality merely for simplifying the following discussion, and the grouping is in no way limiting. In various example embodiments, the I/O components **950** include output components **952** and input components **954**. The output components **952** include visual components (e.g., a display such as a plasma display panel (PDP), a light emitting diode (LED) display, a liquid crystal display (LCD), a projector, or a cathode ray tube (CRT)), acoustic components (e.g., speakers), haptic components (e.g., a vibratory motor), other signal generators, and so forth. The input components **954** include alphanumeric input components (e.g., a keyboard, a touch screen configured to receive alphanumeric input, a photo-optical keyboard, or other alphanumeric input components), point-based input components (e.g., a mouse, a touchpad, a trackball, a joystick, a motion sensor, or other pointing instruments), tactile input components (e.g., a physical button, a touch screen that provides location and force of touches or touch gestures, or other tactile input components), audio input components (e.g., a microphone), and the like.

In some further example embodiments, the I/O components **950** include biometric components **956**, motion components **958**, environmental components **960**, or position components **962**, among a wide array of other components. For example, the biometric components **956** include components to detect expressions (e.g., hand expressions, facial expressions, vocal expressions, body gestures, or eye tracking), measure biosignals (e.g., blood pressure, heart rate, body temperature, perspiration, or brain waves), identify a person (e.g., voice identification, retinal identification, facial identification, fingerprint identification, or electroencephalogram based identification), and the like. The motion components **958** include acceleration sensor components (e.g., accelerometer), gravitation sensor components, rotation sensor components (e.g., gyroscope), and so forth. The environmental components **960** include, for example, illumination sensor components (e.g., photometer), temperature sensor components (e.g., one or more thermometers that detect ambient temperature), humidity sensor components, pressure sensor components (e.g., barometer), acoustic sensor components (e.g., one or more microphones that detect background noise), proximity sensor components (e.g., infrared sensors that detect nearby objects), gas sensor components (e.g., machine olfaction detection sensors, gas detection sensors to detect concentrations of hazardous gases for safety or to measure pollutants in the atmosphere), or other components that may provide indications, measurements, or signals corresponding to a surrounding physical environment. The position components **962** include location sensor components (e.g., a Global Positioning System (GPS) receiver component), altitude sensor components (e.g., altimeters or barometers that detect air pressure from which altitude may be derived), orientation sensor components (e.g., magnetometers), and the like.

Communication can be implemented using a wide variety of technologies. The I/O components **950** may include communication components **964** operable to couple the machine **900** to a network **980** or devices **970** via a coupling **982** and a coupling **972**, respectively. For example, the communication components **964** include a network interface component or another suitable device to interface with the network **980**. In further examples, communication components **964** include wired communication components, wireless communication components, cellular communication components, near field communication (NFC) components, BLUETOOTH® components (e.g., BLUETOOTH® Energy), WI-FI® components, and other communication components to provide communication via other modalities. The devices **970** may be another machine **900** or any of a wide variety of peripheral devices (e.g., a peripheral device coupled via a Universal Serial Bus (USB)).

Moreover, in some embodiments, the communication components **964** detect identifiers or include components operable to detect identifiers. For example, the communication components **964** include radio frequency identification (RFID) tag reader components, NFC smart tag detection components, optical reader components (e.g., an optical sensor to detect a one-dimensional bar codes such as a Universal Product Code (UPC) bar code, multi-dimensional bar codes such as a Quick Response (QR) code, Aztec Code, Data Matrix, Dataglyph, MaxiCode, PDF417, Ultra Code,

Uniform Commercial Code Reduced Space Symbology (UCC RSS)-2D bar codes, and other optical codes), acoustic detection components (e.g., microphones to identify tagged audio signals), or any suitable combination thereof. In addition, a variety of information can be derived via the communication components **964**, such as location via Internet Protocol (IP) geo-location, location via WI-FI® signal triangulation, location via detecting a BLUETOOTH® or NFC beacon signal that may indicate a particular location, and so forth.

Transmission Medium

In various example embodiments, one or more portions of the network **980** can be an ad hoc network, an intranet, an extranet, a virtual private network (VPN), a local area network (LAN), a wireless LAN (WLAN), a wide area network (WAN), a wireless WAN (WWAN), a metropolitan area network (MAN), the Internet, a portion of the Internet, a portion of the public switched telephone network (PSTN), a plain old telephone service (POTS) network, a cellular telephone network, a wireless network, a WI-FI® network, another type of network, or a combination of two or more such networks. For example, the network **980** or a portion of the network **980** may include a wireless or cellular network, and the coupling **982** may be a Code Division Multiple Access (CDMA) connection, a Global System for Mobile communications (GSM) connection, or another type of cellular or wireless coupling. In this example, the coupling **982** can implement any of a variety of types of data transfer technology, such as Single Carrier Radio Transmission Technology (1×RTT), Evolution-Data Optimized (EVDO) technology, General Packet Radio Service (GPRS) technology, Enhanced Data rates for GSM Evolution (EDGE) technology, third Generation Partnership Project (3GPP) including 3G, fourth generation wireless (4G) networks, Universal Mobile Telecommunications System (UMTS), High Speed Packet Access (HSPA), Worldwide Interoperability for Microwave Access (WiMAX), Long Term Evolution (LTE) standard, others defined by various standard-setting organizations, other long range protocols, or other data transfer technology.

In example embodiments, the instructions **916** are transmitted or received over the network **980** using a transmission medium via a network interface device (e.g., a network interface component included in the communication components **964**) and utilizing any one of a number of well-known transfer protocols (e.g., Hypertext Transfer Protocol (HTTP)). Similarly, in other example embodiments, the instructions **916** are transmitted or received using a transmission medium via the coupling **972** (e.g., a peer-to-peer coupling) to the devices **970**. The term "transmission medium" shall be taken to include any intangible medium that is capable of storing, encoding, or carrying the instructions **916** for execution by the machine **900**, and includes digital or analog communications signals or other intangible media to facilitate communication of such software.

Furthermore, the machine-readable medium **938** is non-transitory (in other words, not having any transitory signals) in that it does not embody a propagating signal. However, labeling the machine-readable medium **938** "non-transitory" should not be construed to mean that the medium is incapable of movement; the medium **938** should be considered as being transportable from one physical location to another. Additionally, since the machine-readable medium **938** is tangible, the medium **938** may be considered to be a machine-readable device.

Language

Throughout this specification, plural instances may implement components, operations, or structures described as a single instance. Although individual operations of one or more methods are illustrated and described as separate operations, one or more of the individual operations may be performed concurrently, and nothing requires that the operations be performed in the order illustrated. Structures and functionality presented as separate components in example configurations may be implemented as a combined structure or component. Similarly, structures and functionality presented as a single component may be implemented as separate components. These and other variations, modifications, additions, and improvements fall within the scope of the subject matter herein.

Although an overview of the inventive subject matter has been described with reference to specific example embodiments, various modifications and changes may be made to these embodiments without departing from the broader scope of embodiments of the present disclosure. Such embodiments of the inventive subject matter may be referred to herein, individually or collectively, by the term "invention" merely for convenience and without intending to voluntarily limit the scope of this application to any single disclosure or inventive concept if more than one is, in fact, disclosed.

The embodiments illustrated herein are described in sufficient detail to enable those skilled in the art to practice the teachings disclosed. Other embodiments may be used and derived therefrom, such that structural and logical substitutions and changes may be made without departing from the scope of this disclosure. The Detailed Description, therefore, is not to be taken in a limiting sense, and the scope of various embodiments is defined only by the appended claims, along with the full range of equivalents to which such claims are entitled.

As used herein, the term "or" may be construed in either an inclusive or exclusive sense. Moreover, plural instances may be provided for resources, operations, or structures described herein as a single instance. Additionally, boundaries between various resources, operations, modules, engines, and data stores are somewhat arbitrary, and particular operations are illustrated in a context of specific illustrative configurations. Other allocations of functionality are envisioned and may fall within a scope of various embodiments of the present disclosure. In general, structures and functionality presented as separate resources in the example configurations may be implemented as a combined structure or resource. Similarly, structures and functionality presented as a single resource may be implemented as separate resources. These and other variations, modifications, additions, and improvements fall within a scope of embodiments of the present disclosure as represented by the appended claims. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.

What is claimed is:

1. A method comprising:

communicating, by a server system, at least a portion of a first story to a first client device based, at least in part, on a first client device association with a user segment assigned to the first story, the user segment corresponding to a geographic tier selected from among a set of geographic tiers based on an amount of interest in the first story, wherein the first story comprises a first plurality of pieces of content, and wherein each piece

of content of the first plurality of pieces of content comprises an image or a video clip captured by a respective client device;

receiving, at the server system from the first client device, a first selection communication associated with a first piece of content of the first story;

automatically generating, by the server system and in response to receiving the first selection communication, a second story comprising a second plurality of pieces of content sharing content characteristics with the first plurality of pieces of content; and

communicating at least a portion of the second story to the first client device.

2. The method of claim **1**, wherein each piece of content of the second plurality of pieces of content comprises an image or a video clip, and

wherein the automatically generating comprises selecting, from a database of the server system, the second plurality of pieces of content based on each image or video clip of the second plurality of pieces of content sharing a portion of content characteristics with the first plurality of pieces of content.

3. The method of claim **1**, wherein the user segment is based on a story visibility area.

4. The method of claim **1**, wherein the user segment is based at least in part on a user interest selection associated with the first client device.

5. The method of claim **1**, further comprising:

receiving, at the server system from the first client device, a first feedback message associated with the first story.

6. The method of claim **5**, wherein the first feedback message identifies one or more screen captures performed by the first client device to captures screens associated with the first story.

7. The method of claim **6**, wherein the first feedback message further identifies a percentage of the first story presented on a display of the first client device.

8. The method of claim **1**, further comprising:

receiving, at the server system from the first client device, a second selection communication associated with a second piece of content of the first story;

accessing a third story comprising pieces of content sharing at least a portion of a set of content characteristics of the second piece of content, wherein the third story is different than the second story; and

communicating at least a portion of the third story to the first client device.

9. The method of claim **1**, further comprising:

receiving, at the server system from the first client device, a second selection communication associated with a piece of content of the second story;

accessing a third story comprising pieces of content sharing at least a portion of a set of content characteristics of the piece of content of the second story, wherein the third story is different than the second story; and

communicating at least a portion of the third story to the first client device.

10. The method of claim **9**, further comprising:

receiving, at the server system from the first client device, a return selection communication associated with the first story; and

retransmitting the portion of the first story to the first client device in response to receipt of the return selection communication.

11. The method of claim **9**, further comprising:

receiving, at the server system from the first client device, a second feedback communication associated with the third story.

12. The method of claim **11**, further comprising:

adjusting, a set of pieces of content of the third story based on the second feedback communication.

13. A server system comprising:

a memory; and

one or more processors coupled to the memory and configured to:

communicate at least a portion of a first story to a first client device based, at least in part, on a first client device association with a user segment assigned to the first story, the user segment corresponding to a geographic tier selected from among a set of geographic tiers based on an amount of interest in the first story, wherein the first story comprises a first plurality of pieces of content, and wherein each piece of content of the first plurality of pieces of content comprises an image or a video clip captured by a respective client device;

receive from the first client device of a first selection communication associated with a first piece of content of the first story;

automatically generate, in response to receiving the first selection communication, a second story comprising a second plurality of pieces of content sharing content characteristics with the first plurality of pieces of content; and

communicate at least a portion of the second story to the first client device.

14. The server system of claim **13**, wherein the user segment is based on a set of local geographic areas and the set of geographic tiers.

15. The server system of claim **13**, wherein the one or more processors are further configured to:

manage receipt from the first client device of a second selection communication associated with a second piece of content of the first story;

access a third story comprising pieces of content sharing at least a portion of a set of content characteristics of the second piece of content, wherein the third story is different than the second story; and

initiate communication of at least a portion of the third story to the first client device.

16. A non-transitory computer readable medium comprising computer readable instructions that, when executed by one or more processors of a server system, cause the server system to:

communicate at least a portion of a first story to a first client device based, at least in part, on a first client device association with a user segment assigned to the first story, the user segment corresponding to a geographic tier selected from among a set of geographic tiers based on an amount of interest in the first story, wherein the first story comprises a first plurality of pieces of content, and wherein each piece of content of the first plurality of pieces of content comprises an image or a video clip captured by a corresponding different client device;

receive, from the first client device, a first selection communication associated with a first piece of content of the first story;

automatically generate, in response to receiving the first selection communication, a second story comprising a

second plurality of pieces of content sharing content characteristics with the first plurality of pieces of content and

communicate at least a portion of the second story to the first client device.

17. The non-transitory computer readable medium of claim **16**, wherein the instructions further cause the server system to:

receive, from the first client device, a second selection communication associated with a piece of content of the second story;

access a third story comprising pieces of content sharing at least a portion of a set of content characteristics of the piece of content of the second story, wherein the third story is different than the second story;

communicate at least a portion of the third story to the first client device;

receive, at the server system from the first client device, a return selection communication associated with the first story; and

retransmit the portion of the first story to the first client device in response to receipt of the return selection communication.

18. The non-transitory computer readable medium of claim **16**, wherein the instructions further cause the server system to:

automatically generate the first story by receiving, at an input device of the server system, one or more curator selections identifying the first plurality of pieces of content from pieces of content stored in a content database and by receiving, at the input device, a user segment selection for the first story identifying and the user segment for the first story.

19. The non-transitory computer readable medium of claim **16**, wherein each piece of content of the second plurality of pieces of content comprises an image or a video clip, and

wherein the automatically generating comprises selecting, from a database of the server system, the second plurality of pieces of content based on each image or video clip of the second plurality of pieces of content sharing a portion of content characteristics with the first plurality of pieces of content.

20. The non-transitory computer readable medium of claim **16**, wherein the user segment is based on a story visibility area.

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